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**Some Aspects of the Cultural Life of the Khasas
of the cis-Himalayan Region.**

By D. N. MAJUMDAR.

(Communicated by Dr. B. S. Guha.)

INTRODUCTION.

Over a great area of the Himalayan region, both trans-Himalayan and cis-Himalayan, it is customary for a man to share his wife or wives with his brothers. This is known as fraternal polyandry as distinguished from the matriarchal polyandry that used to be commonly practised in Malabar where the husbands of a woman were not necessarily related to one another. In fraternal polyandry, the wife comes to live with the group of husbands; in the matriarchal form, she remains in her own house, the husbands come to live by turn as visitors. Property under the fraternal type of polyandry passes from father to son, in the matriarchal type, the woman owns it and passes it on to successors in the uterine line. Polyandry appears to have been a widely practised form of marital relationship, and though some authorities tried to nail down polyandry to the name plates of non-Aryan, Tibetan or Dravidian tribes or castes, there is no doubt that Indo-Aryans and their progenitors did preserve this institution, within limits, and today, the various Indo-Aryan tribes living in the region of Turkestan, Hindukush and the cis-Himalayan area are definitely polyandrous. Whether polyandry is a racial trait or not, today it is a system of marriage affecting the lives of at least 30 millions of people.

The Himalayan region contains three important ethnic groups, which have mixed in varying proportions to produce the many types and groups that one meets in these parts. These comprise, as it were, three bands of ethnic formations. The highest altitudes are inhabited by the Mongoloid races whose nomadic incursions into the south, south-east and south-west have contributed to 'yellow' infusion among the descendants of the Indo-Aryan immigrants in these parts. The advance of the Indo-Aryans into the Punjab was marked by successive waves of immigration. They were first established in the sub-Himalayan districts of the Punjab. The plain of the five rivers must then have been dense jungle interspersed with large marshy areas. On reaching the plain, the immigrants could have turned in two directions, either east along the north of the

plain, or southwards along the Baluchistan border. They probably followed both these ways. As a knowledge of agriculture was not unknown to these immigrants, some of them naturally chose the foot-hills to which they had been accustomed while in Turkestan. The penetration of the various Indo-Aryan hordes into the hills and inaccessible tracts may also be due to the fact that the earlier immigrants came in conflict with the incoming hordes who drove them from their original settlements, and the former had to take shelter in distant hills and were given the most opprobrious epithets. The aboriginal population which is Austric or pre-Dravidian is represented by the Dom, a generic name which also includes many artisan castes most of which are hybrids being offshoots of mixed marriages between the Indo-Aryan invaders and the aboriginal races. The Indo-Aryan immigrants who still dwell in their original settlements may have maintained their racial purity, but those of them that have wandered away from their home and have penetrated into secure asylums in the hills and forests have not, though as a result of their settlement among inferior races they established their cultural dominance over the latter. Consequently, the highland regions of the Himalayas form even today a residual island which still preserves social customs that once had probably a more extensive distribution.

The 'Khasas' or the 'Khasiyas' who constitute the high caste people of the cis-Himalayan region are either Rajput or Brahmin, though intermarriage between them has not been barred by the rules of caste endogamy. The artisan castes are recruited from the Doms whom the Khasas brought with them or subjugated. The Rajputs and Brahmins have freely mixed with immigrant people but have preserved themselves from contamination by the infiltration of Dom blood by strict prohibition of marriage with the artisan castes. The latter are decidedly of inferior social status and looked down upon by the Khasas as such. There has been some infusion of Mongoloid blood among the Khasas but it has not occurred to any appreciable extent in Jaunsar-Bawar. It is found in Gharwal and adjoining States and is probably due to Tibetan influence.

The Khasas are usually tall, handsome, fair (rosy or sallow white) complexioned, possess long heads, vertical forehead, fine or leptorhine noses, hazel eyes with a sprinkling of blue, curly hair and other features wellcut and proportioned. The women are also comparatively tall, slender and graceful, of a very attractive appearance and extremely jovial disposition. There is little difference in physical features between Khas-Brahmins and Khas-Rajputs, and intermarriage must have taken place and does take place even today. The mean stature of 100 Khas-Brahmins is 163.3 cms. and that for 100 Khas-Rajputs is 162.4. The mean cephalic indices are 71.33 and 71.60 respectively. The nasal index (mean) for 100 Khas-Brahmins is 66.29,

that for the Khas-Rajputs is 67·25. As the results of anthropometric measurements of the Khasas will be published separately, further details will not be given here. The Khasas are conscious of their superior lineage, for they affiliate themselves to the Pāṇḍavas of the Mahābhārata fame and are indeed proud of their polyandrous custom, as they say it was the usual practice among their progenitors, the Pāṇḍavas.

There is ample evidence of the physical similarity of the Khasas with the Kasmiras and there is remarkable similarity of the Khasa family law with the Punjab customary law, notably with customary law in the Kangra hills. The reference to Khasas along with the Kulutas (residents of Kulu), Tanganas and the Kasmiras in the Brihat Samhita, and of the occupation of Madhyadesha by the Khasas and the Śakas in the Viṣṇu Purāṇa, Hari Vansa and in the Mahābhārata go to prove the antiquity of the Khasas. The Khasas most probably occupied various parts of northern India in prehistoric times, and there is some truth in the statement that they occupied large areas from Kashmir to Nepal. The fact that the Khasas are described in the Mahābhārata (Droṇa Parva) as having arrived from diverse realms corroborates the above hypothesis. Manu refers to the Yavanas several times in his code of laws along with the Śakas, Kambojas and other rude tribes on the borders of India. In one place (X. 43 and 44) he writes as follows: 'The following races of Kshatriyas by their omission of holy rites and by seeing no Brahmins, have sunk among men to the lowest of the four classes: viz., Paundrakas, Odras, Dravidas, Kambojas, Yavanas, and Śakas; Paradas, Pahlavas, Chinas, Kiratas, Daradas and Khasas'. These are all described as Dasyus or wild people who were descendants of the four original castes, mixing promiscuously with one another and neglecting their religious observances (Book X. vv. 12 to 24). In the Mahābhārata it is said that these tribes of Kshatriyas have become Vrishalas from seeing no Brahmanas (Muir's Sanskrit texts, 2nd Edition, I, p. 482).

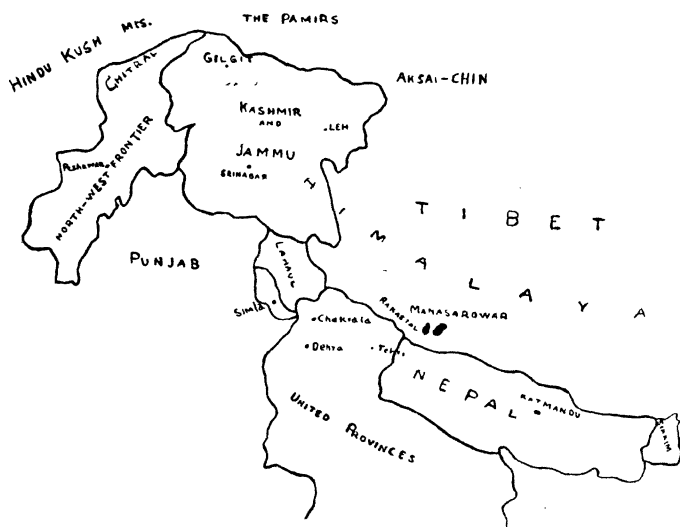
The Khasi clans of Assam are not related to the Khasas of these parts, for the physical features of the two groups differ considerably and unless we suppose a large scale mixture of the Khasas with the Mongoloid tribes of Assam, the Mongoloid features found among the Khasis and absent among the Khasas are difficult to explain. The Khasas probably represent the eastern outpost of Indo-Aryan penetration in the cis-Himalayan region. A. C. Turner writing about the Khasas (Census Reports, Vol. I, pt. III, p. 24) quotes relevant evidence to prove that the occupation of the Khasas took place long before the Christian era.

I propose to describe below the culture pattern of the Khasas or Khasiyas of the cis-Himalayan region. For purposes of intensive investigation, I have confined my study to Jaunsar-

Bawar in the Dehra Dun District, though my observations apply equally to other parts of this culture area.

The Physical and Economic Geography of Jaunsar-Bawar.

"The district of Dehra Dun which occupies the northernmost part of the Meerut Division in the United Provinces, lies between $77^{\circ} 35'$ and $78^{\circ} 20'$ east longitude and $29^{\circ} 57'$ and $31^{\circ} 2'$ north latitude and has an area of 1,193 square miles. Geographically the district is divided into two regions—the Dun proper, which is an open valley enclosed by the Siwalik hills, and the outer scrap of the Himalayas, and the hill Pergannah of Jaunsar-Bawar which is the hill appanage of the Dun. The latter is a roughly oval tract of hilly country with its major



axis lying north and south. The boundaries of these two tracts, viz., the Dun proper and Jaunsar-Bawar, are sufficiently clear and well marked. The Dun valley is enclosed within the Himalayan range, the Siwalik hills and the rivers Ganges and Jumna. The river Tons sweeps round Jaunsar-Bawar from the north and finally with a 'course trending the main south joins the Jumna near Kalsi'. To the north and east of Jaunsar-Bawar lie the States of Tehri, Jubal and Sirmoor, and to the south lies the Dun valley. For administrative purposes, Jaunsar-Bawar is included in the Chakrata sub-division of the Dehra Dun district. The whole of this tract is rugged and full of precipitous mountains with little level ground. There are many tall peaks varying in height from 5,000 to 12,000 ft. and some of these give off ridges, which 'suddenly descend to dark chasm'. The rocks are mostly of lime-stone which account for the irregular and

massive formations. There are many ravines, some bare, some wooded, while the valleys are covered with fine grass enabling herds of buffaloes to live and multiply and supply milk for the *ghee* industry.

Jaunsar-Bawar contains large tracts of forest area and numberless hills densely covered with tall trees and thick vegetation. Few villages are found in these hills as land for agriculture is not available, the declivity of the slopes being too steep for cultivation. The chief species of trees are the *Deodar* (*Cedrus deodara*), the *Chir* (*Pinus longifolia*) and the *Kail* (*Pinus excelsa*). The last is a variety of *Chir*. *Deodar* and *Chir* are both of great commercial importance, and are used in the construction of houses and manufacture of railway sleepers. *Chir*, though not so durable or important as the *Deodar*, is still of great commercial value. Besides supplying timber, turpentine and rosin are extracted from its resin. There are also other species like the *Ban* (*Quercus incana*), *Moru* (*Quercus dilatata*), *Akhrot* (*Juglans regia*), *Darbi* (*Cedrela serrata*) and *Thuner* (*Taxus baccata*). All agricultural implements, the wooden parts of them, are made from *Moru* which also supplies walking sticks. *Akhrot* gives fruit (walnuts) rich in fat while the wood is specially used for making butts for guns and the bark of the *Thuner* serves as a substitute for tea. A number of species of fruit trees are found in the hills, such as *Amla* (*Phyllanthus emblica*), *Hinsar* (*Rubus* species), *Kingar* (*Berberis* species) and *Mol* (*Pyrus pashia*).

There are a number of rivers and rivulets in Jaunsar-Bawar though few of them are perennial streams. In the summer months they dry up and water is only available in deep water holes and gorges sheltered from the heat of the sun, but during the rains, they are roaring torrents, full and swift. The economic value of these rivers lies in the cheap carriage they provide to timber felled in the forests. The difficulty of transport is great in the hills and is minimized in the case of sleepers by the small '*gads*' (rivulets) which are used for transporting them. As there is hardly any market for timber in the hills, it is carried down to the plains and the rivers and streams help in facilitating such transport. Where there are no *gads* the sleepers made on tops of hills are carried down by the dry-sliding method or by human labour; the latter is indeed a painful process particularly where the descent is precipitous. After the sleepers are brought near the *gads*, there is a further difficulty to overcome, for there is seldom enough water in the *gad* to carry the sleepers down with the current. An artificial channel is made by damming water at a distance and the sides of the streams are carefully planted with sleepers in such a way that water may not escape through the gaps in the arrangement. These are stopped by covering the escapes with leaves and grass. When an artificial channel about two furlongs or so is thus made, the sleepers are

put in the water and are pushed towards the *dam*. In this way all sleepers are made to accumulate at the end of the artificial channel which is broken from the mouth and then they float down. A new channel is again made, the process continues till the sleepers reach big rivers like the Jumna or the Ganges which contain water sufficient for transporting them further down. Although the Forest Department spends huge sums of money every year, the indigenous inhabitants seldom take advantage of employment in these forests. The bulk of labour skilled as well as unskilled comes from outside, the skilled from the Punjab and the unskilled from the neighbouring States and Garhwal.

Jaunsar-Bawar forests are rich in natural fauna: *Kasturi* (Musk deer), *Bar Singha* (stag), *Bhālu* (bear), *Sāhi* (Porcupine), *Bāgh* (Panther), *Ead* (Flying Squirrel) and many other species of animals are found. The Khasas eat flesh of *Kastura*, *Ther*, *Barad*, *Bar Singha*, *Ghold*, *Kakhar* and the skins are used for various purposes. There are plenty of birds, *Unal*, *Titur*, *Chakor*, *Phakbons Battak*, *Murgi* whose flesh the people eat, but they do not eat crows or pigeons. The forests are grouped into different classes, some reserved, some protected, others free or village forests. In the free forests hunting is allowed and the men take advantage of it. Hunting is usually a co-operative undertaking in Jaunsar-Bawar, for a number of men join together and take part in regular expeditions. The simplest way is to fence a plot of forest and men and women throw stones inside the fencing so that the animals may come out frightened attempting to escape. Stones are hurled from all directions and after some time the animals get exhausted and succumb to the injuries sustained during the onslaught. The other method is known as *Jibalu* and is ordinarily meant for the capture of panthers. These are greatly feared by the people. A cage-like device is made with stones and wooden planks and a goat is tied inside so that through the small opening which is automatically sealed should the panther enter the cage for the goat, the animal is captured alive. Most interesting accounts of methods of killing bears, are given by Khasas which figure also prominently in the folklores of the hill people. Curious beliefs about the nature and habits of the bear are found in Jaunsar-Bawar. A bear when it attacks men in the forests usually scratches the face of its victim and this, according to the Jaunsari, is due to its proverbial jealousy of the beauty of the human face. Though it is a dangerous animal, the hill people are by no means afraid of it.

Stories are current about the many indigenous methods of capturing bears. The bear, as a rule, attacks men from behind jumping on the back. One interesting method may thus be described though it appears highly improbable; two persons go out into the forest with two long baskets called *Ghildis* and sticks. The bear jumps on one but the latter so adjusts his *Ghildi* that the bear drops into it. The other man then belabours the animal

with his stick. To avenge this the bear jumps on the other man who also places his *Ghildi* in such a position that it is immediately trapped. The first man now strikes on the bear's head with his stick and between the two they kill the animal. This method of hunting bears, if it is practicable (which indeed is doubtful), shows that the hill people are careful observers and they know how to take advantage of the nature and habits of the animals with whom they share the forests.

Jaunsar-Bawar is a cold country. Though in the valleys of the Jumna, the Tons, and their feeders there is considerable heat from March to October, the winter is usually pleasant. On the higher altitudes, the thermometer sometimes records over 20 degrees of frost. The winter months are spent in feasts, and festivities by the people as no agriculture is possible on the hills. This is the time when the hill people kill their goats and feed their neighbours and for a month or more feasts continue and mutton and beer are all that they live for.

The Jaunsaris are very fond of building substantial houses. These are made of timber in beautiful surroundings with the small terraced fields below, and are picturesque in silhouette against the hillsides. The villages are usually situated in valleys or on the slopes of hills, but never on the top. Winter is very severe on the hilltops and continual snowfalls and severe cold blasts make living on the higher altitudes difficult and dangerous to the extreme. The need for warmth in such a climate makes the people extremely fond of the sun, and they build their houses in such a way that they get the maximum period of sunlight. Besides sunlight, water is precious in the hills, and the villages are built by the side of hill springs or on the banks of rivulets, so that water may be brought to the village by channelling it from higher levels.

A group of villages co-operate in distributing water to the villagers and definite schemes for apportioning water by the villages are carefully drawn and executed. These make it obligatory for a village to keep the channel within its boundary in good condition, to insist on the use of water by the village and also to co-operate with neighbouring villages in contributing labour for constructing or reconditioning the springs, reservoirs and channels on which supply of water to the entire group of villages depends. The small terraces available for cultivation are intensively treated as farming demands skilful manuring and irrigation in these regions. Water for irrigation is brought to the terraces sometimes from rivers and rivulets through small *kuls* or channels skilfully cut on the rocks. The usual method is to make a dam across a *gad* or river at a suitable place and from there the water is brought through a canal, one to three feet wide and one to two feet deep to a point at the highest level of the field. If a continuous channel cannot be made on account

of surface conditions, a *patnal* connects the ends of a *khal* or gap which is otherwise unbridgable.

Patnal is made from the trunks of trees, by hollowing them lengthwise so that they may serve as channels for water. The construction and maintenance of *kuls* are often the concern of a group of villages so that they are either made by collective labour or by someone known to be expert in making them. In the latter case, the villagers have to contribute their respective shares towards the stipulated amount to be paid to the artisan or contractor concerned. The contribution of individual families is proportionate to their share in the village land, and is decided by the *Sayana* or headman of the village, or of a group of villages which are served by the *kul*. The maintenance of a *kul* during the months of July and August, when there is heavy rainfall in these parts, is a difficult job and the entire village or a group of villages has to take the work in hand. Though usually there is no quarrel among the villagers on these matters, for the authority of these headmen is still regarded as sacred by them, dissensions regarding the distribution of water are frequent. The headman with the assistance of the elders of the village has then to intervene and settle the disputes.

Another use made of *kul* in these parts is the running of *ghats* or grinding mills worked by waterpower. A *ghat* may be owned by an individual family or a group of families. If it is owned by a particular family its use by others is ungrudgingly allowed and custom demands that a small portion of the ground stuff be given to owner of the *ghat*, as his rightful share. There is nobody to receive it and it is usually kept in a basket or a leather bag, provided by the owner. The Khasas possess an extraordinary sense of right and wrong, of honesty and justice, and they seldom abuse this privilege.

The *ghat* is enclosed within a small rectangular thatched house or one made of timber and slates. The mechanical device is simple enough. As the mill is worked by waterpower, water must be brought down from higher level with sufficient force so that it may set the mill working. Water is brought from *gads* and is carried through a wooden channel known as *pandal* which is dug out of trunk of trees. The *ghat* is made of two round flat stones, one placed over the other, the lower one is the *tali*, the upper one is known as the *pat*, the *tali* is fixed on the floor with an iron nail running vertically through the centre of the *tali* over which the *pat* is placed. This pair of circular stones is connected with a wooden block called the *verum* with projecting flat sticks called *panwals*. It is so arranged that no sooner the running water rushes against the *panwal* the *verum* starts moving and there is a device by which it makes the *pat* move on its own axis—the iron nail. A wooden container wide at the mouth and narrow at the lower end is connected by means of a tubelike arrangement with the *pat*, so that with the rotation

of the latter grain put in the container pours through the narrow end of the tube into the mill which grinds the corn and releases the flour.

We have already said that the Jaunsaris build substantial houses. These are usually built of timber, mud, and slates. For timber they use *Deodar* and it is only the poor people who use inferior stuff. Iron is not very commonly used in these parts. The houses are rectangular in shape and consist of two or more storeys. Each storey has a single room and the height is just enough to allow a man to stand erect. As the average family possesses one house, if it is two-storeyed which it usually is, the ground floor is used to house the cattle so that all the members of the family have to share the only other room in the house. Several brothers with their common wife or wives sleep in this room, so that the total output of animal heat may serve the purpose of comfortable bed. Here also they cook their food, keep their belongings, and lounge during the day. Some families possess a *Kuthar* or small storehouse separately built in the yard, but as the levels of the two houses are not the same they are connected by an improvized staircase. There is not much scope for ventilation in the house except through the big door made of a single solid plank or two or more planks joined together so as to form one piece which can be fastened from inside as well as from outside by means of iron rings, and hinges. Besides the big door at the entrance, there may be one or two small windows in every room, which are like small holes and usually kept shut from inside the room. On the first floor there is a *Khadru* (wall almirah) three feet by one to two feet, which is used for keeping odd things and the small belongings of the family. The oven is inside the room. A big flat stone (*pathal*) is placed on the floor, and another at right angles to it, leaning against one of the walls, the stone is thickly plastered with mud, so that there is no chance of fire heating the stone so that it can set the wooden floor ablaze. The fire in the oven is kept smouldering day and night and is replenished with leaves and twigs as required from time to time so that the inmates of the house can get fire for tobacco and curl round it to keep the severe cold at bay. There are two to three mouths in the oven so that two or more pots may simultaneously be placed over it. A small hole in the roof covered by an adjustable piece of slate provides an escape for the smoke and also allows light to enter when necessary. There is a balcony around the upper storey known as *Chhajja*, made by projecting the wooden beams of the house on all sides and planking them over. There is a wooden railing round the balcony for the protection of the children. In the yard of the house, a small area is paved with flat stones which is used for drying grain and massaging and sunbathing which are popular recreations in these parts. As the people do not take frequent baths due to scarcity of water in the summer, and

intensity of cold in the winter, daily massage and application of oil on the body are regarded as essential for personal hygiene, and it is the wife's duty to oil and massage her husband or husbands. So used are the Khasas to this form of comfort that they regard this service from the wife as a husband's privilege.

The Khasas decorate their houses with carvings on the wooden walls and beams. These are very nicely executed and show unusual skill. The ends of beams which project out of the roof are artistically carved to resemble the faces of men and animals such as panthers, monkeys. Where two or more ends of beams meet the carving shows superb technique in depicting the faces of animals. On the walls of the houses, particularly the front wall of the main house, and the balcony of the *kuthar*, the carvings of flowers, animals, etc., are carefully made. Scenes depicting hunting and other activities of the people are also drawn on the sides of houses.

The front wall of the house is painted brown or light red, and the artistic mural decorations are given their proper colour, so that the houses in Jaunsar-Bawar appear to be attractively designed and substantially built. Old houses which have stood on hillsides for a century or more were all built of *Deodar*, but as the *Deodar* forests have been closed down by the administration, it is with great difficulty the rich among them can secure *Deodar* for building purposes. The poor people now use *Chir*.

The construction of houses is not usually the work of the family concerned. There are certain families known as Oad who are skilled in this work and these are usually employed by well-to-do families. The Oad is paid in kind; during the period he is engaged in the work, his family is fed by the employer and after the work is done, he receives some further reward in coin or kind or both. Every family which needs the services of an Oad has to pay some annual contribution (*dadwar*) to him after the harvests reach the threshing floor. When the house is ready for occupation the owner has to sacrifice a goat in the yard and the blood of the sacrificed animal is ceremoniously sprinkled round the house to propitiate the evil spirits so that the occupants may have nothing to fear from their wrath.

The Jaunsaris use clothes of indigenous make. In the winter they wear a *choli* or woollen *achkan* which reaches down to the knees and a *suntan* or *pyjama* to cover the legs. In the warm weather the *pyjama* is replaced by a piece of rag round the loins and the *choli* over it completes their dress. This is why the people of Jaunsar-Bawar are occasionally described as naked Aryans, because the legs and thighs are completely bare during the summer. For a belt they use a long piece of cloth which is wound round the waist many times. The usual head-dress is provided by a turned cap with the edges rolled up while their shoes are made of leather soles and woollen tops. Recent contacts with Chakrata have effected certain significant

changes in their dress, in pattern as well as in material, and men are found to wear coats and vests which they buy secondhand from dealers in Chakrata. The sizes and cut of the *choli* made locally have also undergone some modification.

The women have not changed their dress much, though there are Jaunsar belles who don jumpers and silk sarces made into skirts which they buy at fairs or in town. The women use a type of *choli* known as *ghundia* which is longer and its lower half is decorated with plaits and flaps. The upper part of *ghundia* resembles a jumper with or without sleeves. It has now become fashionable to don cotton clothes instead of woollen in summer. Women prefer to put on cotton and silk if they can afford to. As they do not spin cotton, most of the cotton clothes are imported from outside, but well-to-do families have planted cotton trees and the spinning of cotton is becoming popular in Jaunsar.

Dress and ornaments have so great a fascination for the women that frequent quarrels with husbands occur if the latter do not provide them with fancy articles of dress or ornaments. While in Gharwal and adjacent Simla States polyandry is being gradually replaced by marriage between single pairs, in Jaunsar-Bawar even a group of husbands often find it difficult to maintain a wife whose demands for clothes and finery are on the increase. Frequent quarrels arise when the wives complain against their husbands for incompetency to provide them with heavy ornaments, and divorce or *chhut* often arises from these complaints.

The usual ornaments worn by Jaunsar-Bawar belles are many and varied and the shape and size of these are different from those one finds on the persons of women in the plains. The majority of the ornaments worn in Jaunsar are meant for the ear, nose, and neck. Various kinds of necklaces are worn of which *Chharu*, *Jantar* and *Khagwali* are the most popular. The *Khagwali* is a thick flat necklet of one piece with the ends thinned out and tightly set round the neck. The *Chharu* is a bead necklace while the *Jantar* worn round the neck is made of flat pieces of silver, square or oblong and of various sizes. The most coveted ornaments are those for the ear called *Murkhula*, and the combined weight of these has the effect of dilating the lobes and elongating the ears. A number of these is usually worn by a woman and the whole ear is perforated to provide a base for these earrings. Often one finds a woman displaying earrings which she cannot hang from the ear, in a string put round the head. All the ornaments thus described are made of silver while the *Natholi* or the nose-ring is usually made of gold. This is a large ring thick at one end being inset with small silver or Munga beads. The thicker or heavier side is kept on top and is tied with a cord to the hair in such a way that it passes over the left cheek bone under the left eye. Besides these ornaments the

women also put on bangles usually known as *Dhagula* which are heavy and worn on the wrists. Men do not wear any ornaments but small earrings are often found on the persons of young men. Tattooing is popular today in Jaunsar-Bawar and women usually tattoo their arms, hand and feet. These are locally done by pricking the parts with a needle and injecting into the scratches a kind of vegetable dye.

General Economic Life

The main occupation in Jaunsar-Bawar is agriculture which the hill people have carried to perfection. The tiny terraces are carefully prepared and are richly manured with cattle excreta which their pastoral occupation freely provides, and water is skilfully brought to the terraces from distant springs, rivers or reservoirs. The land in Jaunsar-Bawar is of different quality and even the same village has lands of varying fertility. The nature of the hills is responsible for this variation in quality, for some hills are made of rock, others of soft earth, and the nature of the soil determines the fertility of the fields. Again land is divided into irrigated and unirrigated, the latter depending entirely on the rains and the moisture that can be preserved on the soil by preventing water from precipitation running out of the field. This is done by putting boundary walls of stones or by putting tree logs to prevent wastage of rain water.

A number of subsidiary occupations are followed in Jaunsar-Bawar, the chief being wool and ringal industries and the manufacture of articles of domestic and agricultural use. The cold climate of the hills makes it impossible for people to undertake any outdoor work during certain months of the year and in these months they necessarily follow occupations which can be pursued without much moving about.

Of the subsidiary occupations of the people, none is more important or more popular than spinning wool for domestic consumption. Every family has to spin wool for its own use and wool is spun by all the members, even by the small children. A small basket is carried about containing a small spindle and carded wool. Whenever their hands are free, they start spinning with their deft fingers. The wool is collected from the sheep and goats which every family in the hills keeps for its use. They graze on the uplands during the summer and in the winter they are brought back to the village. Twice in the year, once in the month of August and once in February the sheep are sheared. The average annual yield per sheep is about four pounds of wool. This raw wool is washed in hot water and kept under water for a couple of days. It is then beaten on stones to get rid of dirt and grease and finally washed. The wool is now dried in the sun and when completely dry, it has to go through a process of cleaning and carding with a bow-like implement called *chūkani*.

Though spinning is done by men and women in Jaunsar-Bawar, weaving is not a general occupation. It is done by low caste people, professional weavers. They are usually paid in kind or in coin, whichever the people can afford. Another subsidiary occupation is provided by the ringal industry which supplies the hill people with baskets and other containers for storing the agricultural produce of the family. These are locally made by the people from ringals (*Arundinaria* species), a light species of bamboo grown in some parts of the hills. Villages which do not possess ringal in the neighbourhood procure them from those where it is grown and a regular system of barter prevails between two or more villages. Ringal is usually bought by payment in grain. The people who sell ringal get it free from the forests and charge their labour to the buyers.

From the list of occupations we have described above, it will appear that the people have not much scope to supplement their income from agriculture. The hill economy is of self-sufficing type and the standard of living in the hills is not high. The few subsidiary occupations the hill people follow do not engage them throughout the year and much of the time is spent on feasts and festivities or in travels undertaken partly of necessity and partly in connection with the important festivals and pilgrimages. The little surplus they have of agricultural produce, they either sell to the shopkeepers in return for some of their pressing necessities, such as *gur*, salt, clothes and implements of agriculture. When the shopkeepers refuse to pay the price demanded the hill men have to walk long distances with their grain put in leather bags to be exchanged for necessities or for cash. Thus the cash they get by the sale of grain is not much, for it is limited by the quantity of grain they can conveniently dispose of. When they return home with the money they keep it for future emergencies or for paying *malgoozari*. Thus money does not circulate much in Jaunsar-Bawar. The presence of shopkeepers at different centres in Jaunsar-Bawar who are mostly immigrants from Dehra Dun, Saharanpur and far off places has made it possible for the villagers to exchange their products without undertaking long journeys but the price they get in return is not remunerative. The shopkeepers who receive the produce from the villagers do not always send it to town. There is a local demand for such commodities as labourers, *thikadars* or contractors and travellers require them and find it convenient to buy them from the shopkeepers.

The Jaunsaris are voracious eaters. They take food 3 to 4 times daily, and on festive occasions they are incredible gluttons. When they are full themselves, they are magnanimous to others as well and every householder entertains his neighbours and feed them on sheep which they keep in a room and fatten on oak leaves. Wine and meat are the most popular items of their diet and all castes including the Brahmin take meat; fish is not

always available but where it is, they are no less fond of it. They take pride in giving feasts and try to excel one another in providing rich and delicious menus. Ordinarily their breakfast consists of a heavy meal of *dalpuri* or fried *puris* stuffed with *dāl*. The mid-day meal consists of cakes prepared from the flour of *Marsha* or *Cholai*; the third meal is of wheat bread taken before dusk and is usually light. Some families may take the third meal before going to bed. Rice, *dal* and *shikar* form the menu of this meal. The poorer families do not get so much to eat and they take inferior food. The coarser millets, leaves of Amaranth and wild vegetables form the simple food, while rice and *urad* are considered luxuries they can ill afford. Pigs and fowl are freely eaten by the lower castes, but even the higher castes have overcome their scruples against eating poultry which they often rear themselves.

The Khasas are extremely fond of drink; they brew their own liquor and drink it to excess. On the occasion of marriage and festivals, they booze day and night. Two kinds of indigenous drinks are locally made. One is called *daru* or *sur* which is a distilled liquor, another *pakin* or undistilled. A special kind of bread is required to prepare *daru* or *sur*. Four to five species of roots (pissar, berry, athu, pepper, etc.) are powdered in an *okhli* and the powder is mixed with flour. The mixture is kneaded with water and made into wet bread. The rolls of bread are arranged in layers with *bhāng* leaves placed above and below each piece and are kept in a dry place for a couple of weeks or more. Later on, these rolls are put in the sun for further drying after which they are stored in the house for future use. This bread is known as *kim*.

The ordinary bread prepared from coarser millets which is the common food of the poorer classes is broken into pieces and put in a big spherical earthen vat with water, enough to cover them. The contents of this vat are daily stirred by the women till they completely dissolve in the water. The *kim* bread prepared by the process described above, is put in this solution and the liquid is kept aside for a week or so, being stirred every day as usual. When the liquid turns sour, which it does after a week or ten days, it is distilled through an indigenous apparatus. The distilled liquor is called *daru* and is used on ceremonial occasions, feasts and on festival days.

The other kind of drink is prepared out of the flour of *jhangora* (a kind of inferior millet) which is mixed with water and allowed to stand over for three months or more. After this period *kim* bread is added to the mixture and the contents stand for another fortnight or so. It is then strained and kept for the daily needs of the family. The precipitate is made into cakes and eaten by the people.

Elaborate methods of preparing food are found in Jaunsar-Bawar. Not only do the people take a large quantity of food,

they know also how to cater to the palate. There are more than a dozen varieties of bread made and each festival has its own kind. From the list of festivals in Jaunsar-Bawar it appears that many of these are associated with particular processes of preparing food and the distribution of the same to friends and relations forms the main function of many festivals. Besides the ordinary kinds of breads described above, they prepare a kind of bread known as *sira*. This is made in the month of *Pous* on the *Sira* or *Siriya* festival day. *Urad* and *masur* are soaked in water, the husks drop off and the soaked pulses are powdered and made into a paste with water. This paste forms the stuffing of bread and when the rolls are baked they become extremely delicious. Another delicious dish is prepared by roasting lumps of kneaded flour. These are wrapped in covers made of leaves put in the oven and when all the leaves have nearly been burnt in the process, the roasted mass inside the cover is ready for eating. Various kinds of *halwa* are also made. Barley meal or flour of millets and wheat is mixed with water and cooked with milk, *ghee* and *gur* or sugar. This preparation can be kept for a number of days as the whole thing becomes hard enough to stand the climate. *Puris* are usually prepared during festivals and they are sent as *samun* or presents to relations and friends. *Puris* are made in the way known all over India, but a special kind is also prepared by keeping the kneaded mass of flour under water for 24 hours or more. This variety has a peculiar flavour due to fermentation.

Though the ordinary diet of the Jaunsari is simple and does not display any great originality in preparation, the various dishes they make during festivals and ceremonies are rich in flavour and in *ghee*, and they take unusual care to see that their guests, friends and relations get the best entertainment possible. Every family keeps one or more sheep shut up in the goat pen from public gaze and fattened on oak leaves. For months, the sheep remains inside the room so that even the nearest neighbour may not know what is in store for him during the annual feast to which he is likely to be invited. Superstitious beliefs are also current among the hill people about the influence of the evil spirits, the evil eye and the evil mouth and this practice is said to guarantee the safety and growth of the animals confined in the pen.

We have described at some length the economic activities of the people, the methods by which they eke out their subsistence, the hardships attending their occupations, the rigours of the climate and the attempts of the people to get used to them. We have also indicated the means of exchange and distribution, the co-operative efforts willingly undertaken by the people for the common good of the village or a group of villages, the skilful devices with which they face nature and her niggardliness. We have also described incidentally their attitude to

life, to their friends and relations, to the environment in which they have grown up. The descriptive account given above may give an impression that life in the cis-Himalayas is not so full of hardships, but as we shall presently see the account we have given does not imply that the average Khasa family is well off economically.

As money does not circulate much in the hills, as the volume of exchange done by money is insignificant compared even to that obtainable in the rural parts in the plains, the standard of comforts enjoyed by them is not very high. The average family is inured to a hand-to-mouth existence and the expense on food and feasting is the only accountable use they make of their yield from the fields and of any supplementary income they may secure. The construction of shelters for the family and the decoration of their persons exhaust all the reserves they possess. As their resources are meagre, life is pretty hard for them in these cold regions. The gods they own are not always sympathetically disposed towards them, for reward is not proportional to effort. By tradition, their gods are known to be restless, like the palanquin in which they are ceremonially carried every year, turning this way and that, swaying to and fro. One year the Jaunsaris get a bumper yield from the fields, in another year they have nothing at all. Nature in these cold heights often conspires with the gods of their own make and shows her tooth and claw in the niggardliness of her favours. Yet the small terraces are carefully worked, water is brought from higher levels by ingenious devices and perfect husbandry of manure, water and rotation of crops is effected.

People have to keep cattle and sheep. The grazing of cattle and sheep on the slopes of the hills and on the higher altitudes keeps the men busy during the major part of the day; carrying dung and other manures from the grazing areas to the terraced fields is exacting labour; the shearing of wool, spinning and weaving have to be done by themselves, the marketing of produce and barter and exchange require co-operative effort while ceremonial undertakings and festivals require joint effort and voluntary subscriptions to the common pool. Thus life in Jaunsar-Bawar is full of hardships and had it not been for their joint family institution, the fate of the Jaunsaris would have been very much different as they themselves would tell you.

Social Structure

The social structure in Jaunsar-Bawar is characterized by a dual organization of economic classes, viz.: the Zemindars and the artisans. The latter, however, should not be confused with similar groups in the plains, for they are recruited mostly from the aboriginal substratum and mostly belong to a group known by the generic name of Dom. Whereas in the plains the artisan classes own land and when they do not, they have the

right of use, in Jaunsar-Bawar the local code forbids a Dom from holding land either as tenant or as Zemindar. On the lowest rung of the economic ladder, is the domestic Kolta who is the hereditary hewer of wood and drawer of water. He does not own any land, lives attached to his master, the Zemindar, and is given food and drink by his master. He lives in a house provided by his master and his expenses, if any, are borne by the latter. Anything other than food, and clothing, if provided by the family retaining him, is converted into a cash advance which he has to pay back should he wish to change his master or seek some other employment. The expenses of his marriage, of a death in his family, of any ornaments he wants to make for his wife and all that he spends at festival time or for propitiating the evil spirits and gods who meddle with his life and happiness, are borne by his master and the debts he owes on these accounts mount up till his future and that of his progeny are mortgaged indefinitely without any prospect of redemption. When he works in the village, he is given some bread in the morning and when he returns from the field in the afternoon, he gets either cooked rice or a measure of *chulai* or *marsha* out of which he prepares cakes. When he goes with the cattle for grazing on the hill slopes he has to remain for days there and his supply consists of the coarser millets such as *jhangora* or leaves of the Amaranth, which are boiled with lentils or a little rice. His house is within a reasonable distance from that of his master so that he may be available whenever required. If he is married, his wife has certain duties allotted to her and often has to drudge to earn her food.

Higher in rank are the *Lohars*, *Chamars*, *Odhs* or carpenters, who are requisitioned to serve the higher castes and whose remuneration depends on customary laws and not on the nature of the job or the demand for it. Next come the *Bajgirs* (musicians), barbers and a few others whose right to hold land on their own account is not openly challenged by the Zemindars but who commonly live on the customary dole offered by the villagers and traditionally prescribed for them. The blacksmiths, for example, get sixteen seers of grain for each plough, shoemakers, sixteen seers for each man and eight seers for each woman and barbers five seers per head, paid twice in a year, at harvest time. In return for such gifts, these artisan classes serve the village by providing music on ceremonial occasions and doing other kinds of service as may be needed of them. Then come the Rawats who are of Rajput or Khasa origin. They hold land and also work as labourers in the forests and even go to Chakrata or Kalsi in search of employment. The Rawats in Jaunsar-Bawar are said to have immigrated in recent years and they are believed to be descendants of the Gharwali colonists.

The Rajputs form the most important numerous social group in these parts. They do not speak western Hindi which

is spoken by the people of the Dun district. Their language is called Jaunsari which is a dialect of the Central *Pahari*. The Brahmins are not of superior cultural stock nor have they maintained their endogamy. The *Gangaris* are the most numerous among the Brahmins. They are a regional group including as it does all the Brahmins who dwell by the Ganges river. They practise polyandry like the Rajputs and other castes of Jaunsar-Bawar and are called Zemindars. Where there are temples, as for example, in *Lakha*, they divide the duty of the priest's function of officiating in the temple among themselves and each family living in the neighbourhood gets a share of this duty by turn. Very few caste restrictions are observed as far as interdining or commensality is concerned, but where there is a village well, the Brahmin does not allow others to draw water or fill their pitchers or *gharas* from the well. The Brahmin comes at particular hours, and all those who want water get their vessels filled by the Brahmin. This duty of the Brahmins is also distributed among the families and in return for this service, the families who get it, offer some remuneration, in kind at harvest time. Another section of Brahmins in the hills are known as the *Sarolas* who occasionally emigrate from Jaunsar-Bawar and work as cooks in various parts. These observe certain rules regarding interdining and ceremonial purification and abjure meat and wine but they form a comparatively small group.

The territorial unit in Jaunsar-Bawar is the village. Each village has a headman or *Sayana* who is not the elected chief. Originally he was nominated by the *Sadar Sayana* but his office today has become hereditary and he is subordinate to the *Sadar Sayana*. Remnants of a feudal system are still discernible in the tenures of Jaunsar-Bawar. The *Sadar Sayana* who was in earlier days known as *Thokdar* is the overlord and is responsible for the management of the *Khat* or *Patti* and he represents his *Khat* in all its relations with the local administration. The *Khasas* are believed to be immigrants in Jaunsar-Bawar. They appear to have come in nomadic hordes each under a *Thokdar*. The families which constituted the nomadic group settled down in different villages but acknowledged the authority of the *Thokdar*. The villages, which remained under a *Thokdar*, were bound by certain obligations to the latter. His importance as leader of an immigrant horde was recognized by the villages and he received many services and dues from his party men in the shape of gifts and customary dues payable to him on important occasions and festivals. Each family had to give twelve days' free labour in a year to the *Thokdar*. When a child was born in a family, the *Thokdar* received a gift, when a girl was married, he received something; when a new house was built, he was offered a present by the family concerned. When a sheep was killed by a family, one leg was sent to him. In return

for these considerations or tributes, the *Thokdar* looked after the interest of the villagers in his *Khat* and organized defence against raiders, settled disputes as arbitrator and undertook to defend the rights and privileges of the families owning allegiance to him. To-day the *Sadar Sayana* or *Thokdar* does not wield much influence and the village *Sayana* has asserted himself and has secured greater rights and privileges than were enjoyed by his predecessors.

The village community consists of a group of proprietary cultivators, these are known as *Zemindars*. They are also called *Mauroosi* cultivators as opposed to *Gair Mauroosi* or under cultivators. The latter cannot alienate the land and are to all intents and purposes tenants. When they give up the land, it reverts to the proprietary body and when the *Zemindars* give up their own land, the co-owners exercise the right of pre-emption. The *Zemindars* are *Khasas* who cultivate their own holdings themselves with the help of a number of agricultural serfs called *Koltas* whom they maintain and who can demand to be maintained by them.

The political importance of the *Thokdar* was immense in earlier days and the control he exercised on the people of his *Khat* was a matter of great concern to the administration. In the native States where the system was more developed, political expediency necessitated the divesting of some of the rights and privileges of the *Thokdar*. Tactless handling of the situation led to trouble in some States but with the gradual tightening of central authority, the *Thokdar* lost much of his pristine status, and today he is not a force even in his own *Khat*. Bereft of his political authority, he is still an important link between the village headman and the administration and has been used to the advantage of the latter. With the weakening of the hold of the *Thokdar* or *Sadar Sayana* the *Khat Panchayet* consisting of the *Sayanas* of all the villages in the *Khat*, over which he presides, has lost its jurisdiction and influence and disputes between two villages are not usually referred to the *Khat Panchayet*, but are settled by the *Panchayets* of the two villages concerned.

The village *Panchayet* is a body of three to five persons presided over by the *Sayana* who is the *Sir Panch*. The elders who constitute the *Panchayet* are drawn from elderly men, selected for their tact and experience. Knowledge of men and matters, sojourn in foreign lands and experience as functionaries of the Government in some capacity or other, are some of the necessary qualifications for membership of the *Panchayet*. This organization is more or less permanent without any recognized constitution or procedure. Its proceedings are informal and it meets whenever there is an occasion to do so. The *Panchayet* acts as an arbitrator in disputes and its machinery is successfully utilized to organize periodical festivals, fix dates

of ceremonies, collect subscriptions for such purposes, look to the supply of water for the village and for irrigation, to supervise the morals of the villagers and to assist the village headman in the discharge of his duties and responsibilities. In one case, which was decided in our presence, a girl was betrothed to a young man by her father and the latter received a *Tando* or earnest money of Re.1. A few weeks later, there was an altercation between the bride's father and an uncle of the bridegroom-to-be, and the former called off the match and married his daughter to a third party. The *Panchayet* of the *Khat* was informed and the father of the girl was fined sixty rupees and was asked to give a feast to the aggrieved party, and the *Panchayet*. If a *Kolta*, *Chamar* or a member of an artisan caste is found to elope with the wife of a Rajput or a Brahmin, exemplary punishment is meted out to the man and anybody who harbours the couple or aids them is severely punished. A heavy fine or *har* is imposed by the *Panchayet* varying from Rs.125 to 300 or more, and this amount when realized from the offender is divided equally between the aggrieved husband and the members of the village. If the offender does not pay up, the couple must leave the country. If, however, the man who elopes with another man's wife can prove his previous intimacy with the girl, the amount of the fine is reduced considerably. When a person belonging to the higher castes seduces a woman of similar social status, he has to pay a fine of sixty rupees only. A low caste man who commits such a crime can be kept by a *Khatdar* on payment of a *wergild*. Crimes such as the theft of sheep, goats, etc., are usually dealt with by the *Panchayet* and if the culprit is traced, he is asked to make good the theft and pay a fine. In a case of theft in the village of Jadi, the thief who stole a goat was asked to pay back five goats of which two were given to the owner and the remaining three to the *Panchayet* and the village, who celebrated the occasion with a good feast. Whenever any partition of property is made by the *Panchayet*, the *Sayana* receives as his share, one sheep, one goat, one metal utensil, one weapon and five rupees. The *Panchayet* receives five rupees and the villagers two rupees but in the case of poor families, the fees are considerably reduced and sometimes no payment is made to anybody.

The Khasas are a patrilocal people with patrilineal inheritance and patronymic designation. Each village stands as a social unit and is usually exogamous. The joint family system prevails. A group of brothers live together with one, two, or more wives under the same roof, the brothers sharing the wives in common, without exclusive rights of cohabitation with any one wife. The eldest of a group of brothers wields a dominating influence in the domestic affairs of the family, he is the social as well as the ceremonial head of the family. It is to him the other brothers have to turn for advice and guidance.

He determines the duties of the brothers, provides the necessities of the family, and the rest of the brothers have to obey him, and to hand over to him their individual earnings. If a brother wants to marry any particular girl of his choice, the eldest brother goes through the ceremony of marriage with the girl and he may assign the bride to the particular brother concerned. If there is a dispute between two brothers and it may occur on account of rivalry and jealousy between them, the eldest brother arbitrates and his decision is final. If he asks the common wife not to bestow her favours on any of the brothers, the aggrieved brother has no appeal to any higher body in the village. Society upholds the dignity of the eldest brother. The alternative is chaos which the society dare not encourage. The children of the joint family of a group of brothers are maintained by the family and paternity is decided by a useful convention. The eldest born child is fathered upon the eldest brother, and the next child on the second and so on. In case of a dispute between brothers, which may arise when one of the fathers wants to live apart and start a new establishment, the joint wife may be asked to name the fathers of her children—alternately the husbands of the joint wife may draw lots to determine paternity of children born to the family. If four brothers have one wife between them and four or five children are born, and one of the younger brothers marries again, the children usually remain with the woman and the latter is not allowed to go to the younger brother. She must live with the other brothers but the children are entitled to equal shares from all the brothers including the youngest. If the other brothers wish to separate, the eldest brother has to bear the expenses of their marriage as well.

Customary laws in Jaunsar-Bawar make the eldest brother receive the lion's share of the property when partition takes place. According to the laws of inheritance in force, property is divided in the following manner:—After deducting one thing of each kind and one field for *pitans* or *jethong*, viz., on account of seniority, and half of that field, viz., *kanchoo*, for the youngest, the rest is divided equally among them. The family house in Jaunsar-Bawar apparently belongs to the eldest brother, the crops are his, the cattle and sheep are owned by him and the wife and children and their maintenance and control are his. He is the governor of the family and his brothers accept his rule and authority without a grumble. Cases have been found when a younger brother has rebelled against this social and economic monopoly, has forced the elder brother to a partition of the family property, or to the granting of exclusive right of cohabitation with a particular wife, but to the extent he gains individual rights, he loses social prestige and very often his wife deserts him afterwards. It may sound strange to a capitalistic society, but it is a fact that if a man happens to be the only son of his

parents, he stands little chance of securing or keeping a wife, for a wife would not care to live with one man as she would have to do much work for the family. He must, therefore, find out his cousins or collaterals before he decides to marry and settle down.

The custom which allows such a privileged position to the eldest brother has no little influence on the familial relations in these parts, and it is no wonder that the eldest brother wields such great authority in the domestic economy of Jaunsar-Bawar. Complaints against the behaviour of the eldest brother are infrequent and if they arise, they are not viewed with equanimity by the village elders. The individuality of the members in a joint family is thus circumscribed by the traditional loyalty to the head of the family, demanded of them. Besides this attitude of loyalty to the eldest brother, there are other considerations which make partition of property extremely uneconomic as we have already referred to.

Cultural Life

The culture of the Khasas of Jaunsar-Bawar has been deeply impressed by their contacts with the Doms or the aboriginal element in the population. The Doms belong mostly to the Austric race and their cultural life greatly resembles that of the various tribes of Pre-Dravidian or Australoid origin. While the Khasas claim to be Hindus and recently they have been fast adopting Hindu surnames and trying to establish connection with the Rajputs and Brahmins of the plains (their contacts with the outsiders have taught them the importance of their claims), their social life as well as their beliefs and practices connected with their religion do not identify them with the Hindus of the plains. They remarry widows, practise levirate, sororate and polyandry, recognize divorce as legal, while intermarriage between the various Khasa groups is not tabooed and children born of such marriages do not suffer any social stigma. While they worship Hindu gods and goddesses, they have a partiality for ancestor spirits, queer and fantastic demons and gods and for the worship of stones, weapons, dyed rags and symbols. On the other hand, their customary rites in the temples, the manner and mode of offering sacrifices the daily religious performances in the temples, the dim lighting, the burning of incense, the mysterious incantations and sing song monologues, all indicate Hindu origin, tradition in ritual and temple worship.

The sun, the moon and the constellations are their gods. The sun is male and the moon female. The moon's pride on account of her greater beauty and her insulting behaviour towards the sun on that score, provoked the latter's wrath and his curse had the effect of disfiguring the moon's face resulting in spots which are said to be marks of leprosy to which the people are often victims. The Hindu belief that the earth rests

on the head of a snake, *Sheshnag*, finds its counterpart in Jaunsar-Bawar and earthquakes are believed to be caused by the periodical movements of the giant snake. The Mundas believe that eclipses of the sun or moon occur when their creditors surround the sun or moon for the debts of the Mundas and this represents the typical belief about eclipse among all the Austriac-speaking tribes in India. Among the Khasas, the sun and moon are said to have borrowed money from a Dom, but the interest swelled to such an amount that it could not be paid and the debt was repudiated. The Dom on that account worries them often by throwing a skin on their face. Though the average Khasa is always in debts, the stigma attaching to persons of higher castes who borrow from the Dom is great in Jaunsar-Bawar, and the elders belonging to the higher castes do not tolerate such practices in the village. The customary raising of *menhirs* and other stone memorials among the Khasas appears to be a relic of a megalithic cult which is an important phase of Austriac culture. The Khasiyas appear to have in all probability, borrowed this custom from the aboriginal element in these parts. It is customary to construct a terraced platform near a public thoroughfare on which they place a single upright stone to commemorate the dead.

The belief in the transmigration of souls and in the doctrine of metempsychosis is an important feature of their religious life; they believe that the soul has to pass through as many as 84 lakhs of forms including animals and insects and the activities of man on earth are carefully recorded by *Yama* whose messengers have to present the souls before him. As *Dharmraj*, *Yama* determines the form which a particular soul should pass into, in accordance with its activities on earth.

Their religion is a curious blend of Hindu and tribal beliefs and practices and a functional analysis of these is sure to provide interesting materials. Nowhere perhaps are magic and religion so closely interlaced and interwoven as in Jaunsar-Bawar. Magic plays an important rôle in the life of the hill people by giving them confidence in danger and crisis, and by providing the incentive to organized undertakings. Not only in the main occupations of the people like agriculture and lumbering, in ordinary day to day life, magic is potent and effective. The importance of the evil eye and the evil tongue is recognized by the hill people and oaths and ordeals have a significance hardly paralleled in savage society. It is possible to effect injury to person or to cattle or both by magical practices, to cause death in a family by mere swearing as they believe, and to cause houses to be burnt by magic. The courts of justice recognize the importance of oaths and ordeals and when the necessary evidence in a civil case is not forthcoming the parties are allowed to decide the issue by means of oaths and ordeals. In some cases, the defendant in a money suit will keep the sum of money

before the image of the goddess *Kali* or in any temple dedicated to *Mahasu* their great god and the plaintiff is asked to take the money. Should the defendant want to prove that the money he owes has been paid by him, he drinks the water in which the feet of the *Devata* are dipped and this is taken as evidence to the effect that the money has been paid by the defendant. In other cases, the plaintiff will light a lamp in a temple and the defendant has to put it out proving thereby that he has paid the amount due from him. If a villager bears a grudge against his neighbour and he wants to harm him or his effects, he takes a clod from his field and lays it on the altar of *Mahasu*, and prays for an immediate judgment. Should this neighbour meet with any accident or domestic trouble, he would leave his field as otherwise the god invoked by his enemy may cause greater calamity to befall on him. The consequence of dishonesty and false statement on oath is terrible as the person is sure to be affected with insanity or leprosy, or some great calamity may occur in his family, or he may die an unnatural death within a short period from the commission of the offence.

People who are notorious for their wickedness are supposed to possess some power either inherent in them or derivatively acquired. For example, they are known to abuse people and swear against them on the slightest or no pretext and the belief is that such persons can do harm as their *Ghat* or swearing is usually very effective. There are certain gods whom wicked and antisocial people usually invoke to effect their nefarious designs on others. One such evil spirit is *Narsin* who is extremely mischievous and is readily invoked to harm or destroy cattle and crops and to afflict people with diseases. The *Baki* or diviner has to get in touch with this spirit and propitiate it whenever it is suspected of evil. Though it is a criminal offence in Jaunsar-Bawar to call any person a 'witch', it is common knowledge in these parts that witches exist, and whenever any person meets with any misfortune or contracts any serious illness, the members of his family may suspect any woman, young or old, to be responsible for it and she is dubbed a witch. Henceforward, she becomes an object of close attention in the villages and her family is branded as antisocial and consequently segregated from the other families in the village.

The incidence of infant mortality is pretty high in Jaunsar-Bawar, and it is traced to the influence of certain evil spirits. These are always after children and women in the family way and their attention is followed by disease and death to their victims. There are people specially versed in spirit-lore who utter magic words and blow ashes over the child or woman believed to be affected by spirits and this is considered potent enough to cure the affliction. When a pregnant woman falls ill, it is believed to be due to the mischief caused by certain evil spirits and the woman has to undergo a course of treatment.

prescribed by the *Baki* or *Ghadiala* (witch-doctor). With her hair dishevelled and forehead painted lavishly with vermilion she is made to sit near the witch-doctor. The latter takes a bell-metal plate in his hand and starts beating it to tune, uttering simultaneously a number of incantations in a peculiar singsong tune. After half an hour or so, the woman feels heavy, starts shivering indicating thereby that the spirit has entered her person. The woman shows signs of greater animation and moves her limbs to and fro, attempting to rise on her toes and eventually starts dancing to tune of the bell-metal music. Soon she forgets herself, her husbands and relations, and is metamorphosed as it were into the spirit which has taken possession of her. The *Ghadiala* addresses the spirit in the woman and the latter answers on behalf of the spirit. The source of the attack, the name of the spirit, the necessary offerings and sacrifices that would please it and any particular direction as to the manner and mode of disposal of the offerings are mentioned by the possessed woman and it is believed that as soon as these are offered as directed, the woman gets rid of the spirit possessing her. The spirit, however, leaves the victim in a spectacular manner. The woman shrieks, or strikes herself with some stick, or makes violent attempts at escape and is often forcibly brought to rest by the people present. This and similar practices show the extent of the influence of tribal beliefs and practices on the cultural life of the Khasas.

When epidemics invade a village, the resources of the village are freely requisitioned by the headman concerned and custom prescribes an *Astabali* or sacrifice of eight lives to appease the godling of disease. Five different approaches of the village are selected for the purpose and at each approach an improvised gate of bamboos is made. At the centre of each gate is fixed the wooden effigy of a monkey and a vertical slab of stone or menhir is firmly fixed in the earth. The menhir is crowned with a large round stone and two pieces of wood with flattened ends are tied on either side of the upright slab, the whole resembling a human figure from a distance. Five different sacrifices are offered at the five approaches to the village. At one, a goat is killed and buried near the menhir, at the second place a sheep is similarly sacrificed and buried. A hen, and a pig are sacrificed at the third and fourth approaches respectively, while at the fifth, they cut a pumpkin into two halves and bury it likewise. After the sacrifices at the selected places, the villagers all assemble in the yard of the temple where a sheep and a vegetable (*Gindoro*) are offered as sacrifice. The *Gindoro* is cut into pieces and the sheep is killed and given to the Doms. A goat is sacrificed in the name of the village and the meat is distributed among the villagers. The elaborate rites of *Astabali* are performed only when a major calamity is feared and the efficacy of this prescription is seldom questioned by the villagers. The village priest

is in charge of this sacrifice and he cites hymns and prayers as well as magical incantations to invoke the aid of the gods.

They do not appear to be much concerned with rewards and punishments in the world to come but they observe a code of conduct which, if followed, is believed to pave the way to a prosperous life in this world and uninterrupted bliss in the next. These refer to their food, sleep and sacrifice. They must not drink pure milk and they should abstain if possible from butter as it may better be burnt in the temple of the gods. It is on ceremonial occasions and festivals that they may eat butter after it is dedicated to the gods as offering. They should offer the best sheep or goat to their gods as sacrifice and they should not sleep on beds with four legs, usual practice in Jaunsar-Bawar is to sleep on the wooden floor.

The principal occupations are safeguarded against interference by the forces of evil which people their imagination by a system of protective and productive magic. It is true that the efficacy of these magical rites is being minimized by the people but this has not caused any serious challenge to the traditional code of conduct so far as it relates to the observance of rites of protective magic. Magic embraces practically all spheres of activity. When they build a new house, they have to protect it from destruction by fire, or from calamities that may fall on the inmates, and the usual practice is to sacrifice a goat or sheep to the evil spirits and the blood is sprinkled round the house. When the bridegroom comes back home with the bride, before the couple is allowed to enter the house, some relative, usually the maternal uncle, throws down from the roof of the house a live sheep in front of the couple below. The relatives and friends of the couple tear pieces of flesh and bone from the animal and there is a scramble among them for the heart and liver of the sheep—which when eaten raw, ensures good luck to the eater. The bride and the bridegroom are then allowed to get inside the house.

When the harvest are brought home or the first sowing takes place, the evil spirits are propitiated by individual families while a common sacrifice is made by the village to undo the evils of magic. Human sacrifice is non-existent, but the efficacy of it in theory is not denied by the Khasas. The custom of rope dancing which formed an important annual festival in these parts has become obsolete as it has been forbidden by the administration on account of the risk to life involved in the process, but in times of agricultural calamities occasioned by the vagaries of rainfall or by insect pests and diseases to crops and cattle, they remember the olden days when the annual *Bedwart* (rope dancing) provided the necessary safeguards against such supernatural visitations. Even today in Rawain, a neighbouring State, *Bedwart* is allowed to be practised under

police surveillance as the people have made repeated representations to the State authorities not to interfere with the age-old magico-religious practice. The failure of rains and harvest they trace to the non-observance of their magico-religious practices and the State had to yield to their persistent demands. The *Bedwart*, as was practised in earlier days, was a cruel custom as it subjected the *Beda* or dancer to physical violence. Originally, a lengthy piece of rope stoutly made was tied to two peaks of unequal height and the rope was greased for days and weeks to allow the *Beda* to slide smoothly from the higher to the lower end of the rope. The *Beda* after a ceremonial bath, was seated at the highest end of the rope and was given a push and the greasy rope did the rest. The *Beda* glided down the rope at a terrific speed, somehow clinging to it, and the vast crowd gathered to watch the ceremony broke into loud cheers as the *Beda* approached the end of the lower peak. If the *Beda* accidentally missed his hold of the rope, it was fatal for him, for he would certainly dash against the ravines hundreds of feet below and be shattered into fragments. If he succeeds, as he usually does because it is undertaken after long preparation and practice, he loses his hold of the rope immediately before he reaches the other end, and drops down into the arms of a receptive crowd who carry him on their heads and move with him through the crowd. The piece of cloth or rag he puts on is torn to shreds by the crowd and each man keeps a thread or two from this cloth as protection against natural calamities and as a sign of good luck and prosperity. In the scuffle that ensues to secure this luck, the *Beda* loses not only his cloth but even tufts of hair from his head and may receive even serious injuries. Other magico-religious rites include naked dances before sowing, during the growth of the crops and after harvests. Playing with red hot iron rods, swallowing burning charcoal and such other ordeals are some of the other precautions designed to safeguard their material prosperity and domestic bliss.

The Family

The typical Khasa family consisting of a group of brothers as husbands with one, two or more wives and children represents a social and not a biological group. The father is not the physiological father but functional in the sense that children address him by his functional name as for example, father-who-looks-after-the-house, father-who-tends-the-sheep, father-who-grazes-cattle and so on. The close tie between the child and mother that we get in a stable monogamian family cannot develop in a polyandrous society of the type we get in Jaunsar-Bawar. The frequency of the practice of *Chhut* or divorce makes the wife a loose unit in the family and she changes her affiliation pretty freely. The care and maintenance of the children therefore devolves on the group of fathers, particularly

on the head of the family and it is the duty of the latter to see that the children get the proper attention and necessary instruction in the formative years. The mother has to perform her duties and comply with the obligations of motherhood so long she remains a member of the family and conforms to the rules of residence customary with patrilocal groups. But as she migrates periodically to her parent's village at harvest time and during the festivals, the children do not get her company throughout the year. The normal socio-psychological association between mother and child cannot develop on account of frequent interruptions by these voluntary migrations. The novel situations arising out of customary participation of the people in fairs and festivals, the variety of interests they stimulate and the scope they provide for satisfying the genuine curiosities of children lose much of their significance in shaping the mother-child relationship. The importance of these casual migrations of young married women to their parents' village will be realized when it is known that in the villages we investigated most of the married women between the ages of 15 to 35 were absent and women of the same age group belonging to the village but married in other villages replaced them as domestic help and farm hands during the harvesting season. Women above 35 and those whose psycho-sexual life has lost its intensity of exuberance and women who are sick or diseased do not move from the village and they with the girls of the family manage the household and care for the children. This seasonal interchange of women between villages has a number of advantages for a polyandrous community. Firstly, it allows a release of tension in sexual life for with the return of the girls of the village to their parents' house and the absence of the wife or wives from the village, opportunities for extra-marital relationship increase and intrigues within the village are possible without a disturbance of normal wedded life. Secondly, the periodical return of the girls of the family reduces the instability of the family relationship in the event of wives leaving the family permanently, and ensures continuity of economic existence of the family. Thirdly, the seasonal residence of the wife in the husband's house and periodical migration to her parents, the knowledge of the two standards of morality enjoyed by women in Jaunsar-Bawar, and the possibility of easy *Chhut* while reducing the sanctity of marital obligations also temper marital jealousy.

In a polyandrous society, in order that social life may run smoothly, marital jealousy must be absent, and this is so in fact, we are told by competent authorities. It is true—that when several brothers share one wife the brothers must not quarrel over her, and custom and tradition determine the attitude of the brothers to one another and to the wife. The importance of the eldest brother or *Jeth* among the Khasas generally and in Jaunsar-Bawar particularly has greatly minimized marital

jealousy as it is not usually possible for the other brothers to possess the wife sexually so long the eldest brother resides in the house. In practice, however, the eldest brother does not exercise this sexual monopoly and his frequent absence from the house provides the necessary transference of sexual rights to the next of the brothers. Besides, the disparity in the age of the brothers makes it possible for the elder brothers to secure to themselves the right of cohabitation till the younger brothers come of age and in ninety cases out of a hundred, a second wife is taken in the interest of the younger brothers. But jealousy between brothers for the affection of a common wife is not rare and manifests itself in the demand by the husband concerned for better attention to his needs and comforts. In such cases, the wife, if she is clever, manages her obligations to the satisfaction of the husbands concerned. If she does not, quarrels do take place and the eldest brother may order a dissolution of the marriage. While quarrels between brothers are obviated by customary rules of conduct as described above, those between co-wives are of frequent occurrence. Unless the second wife happens to be the sister of the first as is very often the case or someone in whose selection the first wife had a voice, no second wife can be taken while the first remains in the house. She must be divorced before another wife can be brought in. Thus the wife's sister is normally preferred to others as a second wife in Jaunsar-Bawar. When they get a second wife, precautions are taken to see that quarrels between co-wives may not occur too often and magical rites have been introduced to remove the shadow of misunderstanding. When a second wife other than the sister of the first one is taken, an interesting ceremony is gone through. The second wife is made to sit in one corner of the room, the first wife sitting opposite to her while an elderly woman with a lighted *dip* in her hand stands by each of them. Another woman stands in the centre of the room and joins their hands and each gives the other a silver coin. The *dip* is held in such a way that the shadow of the one does not fall on the person of the other.

Marital Life

Marriage in Jaunsar-Bawar takes place early in life. Between the ages of 2 to 10 years most of the girls are married, though this does not mean that cohabitation follows earlier than in the plains. From the cases we have noticed of girls proceeding to their husband's village for residence for the first time, it does not appear that the girls have to do so before they are seventeen or eighteen and this is a fair arrangement as puberty sets in later in a cold climate. Occasionally, however, a girl of 8 or 10 may come to live with her mother-in-law for a couple of months or so and assist her in her domestic obligations, but such residence has not been abused by the husband or group of husbands.

Besides in the case of a first marriage, the bridegroom also is of tender age and the possibility of an earlier consummation of marriage is remote.

When a son is to be married, the father approaches the girls' parents and asks for the girl. If the father or guardian of the girl satisfies himself as to the suitability of the marriage, he may demand the nominal bride price which is usually one rupee. The Pahari Brahmin then decides the date of marriage. On the appointed day 2 to 8 persons from the bridegroom's village come to the bride's house and are cordially received by the bride's people. The party is entertained to a sumptuous feast and the villagers get up a dance in which the party from the bridegroom's village take part. Next morning a hundred to two hundred persons proceed with the bride to the bridegroom's house singing and dancing all the way till they reach the outskirts of the village, their destination. All the villagers, men, women and children, assemble there to receive the guests and lead them to the bridegroom's house where they take care of their guests. A heavy menu at dinner with a large quantity of liquor served before and after the meal, a gala dance in which people from both sides take part, continuous singing by the women, the tom tom of drums, on either side, and sometimes a hunting excursion to the forest nearby, all make the ceremony a memorable event. Poor people cannot entertain their guests on such a large scale and the people who participate in the function from the village of the bride as well as those from their own village provide the necessary assistance for the family concerned in the shape of gifts which consist of rice, flour, *ghee*, *gur* and sheep or goats.

In the case of poor families, however, it is not possible to invite every villager to the feast. So one person of each family is invited to join the festivities and to give the ceremony a representative character. Even then the village acts as host and all the necessary arrangements are made by the villagers whether they are invited to the feast or not.

The ceremony of marriage is extremely simple. The Pahari Brahmin puts a *Tilak* of *Pithain* or vermilion on the forehead of the bride in the bridegroom's house and on the bridegroom's forehead in the house of the bride. He also cites some *mantrams* in the presence of the couple while he may, if he is asked, sacrifice a goat in honour of the great god, Mahasu, to whom he prays for prosperity and happiness for the couple. Before the food is sent to the guests, a plate of it is offered by the priest to the village god. This is obligatory on all occasions of feasts and festivals in the village.

Besides the ceremonial gifts of a rupee, the bridegroom's people may and very often do pay a small sum to cover the expenses of the bride's parents. Where the financial and social status of the parties differs, as for example, when the bridegroom

is not well-to-do and the bride's parents are, or when both the parties are well off, the bridegroom has to pay some money as bride price. But this amount need not be paid all at once. Half the amount is payable before marriage and the other half after the woman has proved her fertility. This amount is not paid if the woman after marriage proves barren. Barrenness is a frequent complaint in these parts and a husband who has paid a big sum as *Jeodhan* and has spent more on entertaining his friends and relations must be given some relief. Should the woman prove sterile, the bride's parents have to refund the other half of the dowry, and also have to receive the girl back if need be. A reasonable period after cohabitation starts is allowed to the wife to prove her fertility and if she fails to do so, she is returned to her parents and the necessary *Chhut* or divorce is obtained. Besides the fertility question, there is another practical implication of this custom, i.e. paying half the bride price and retaining the other half to be paid when the girl becomes a mother. The girl is married at the age of 3 or 4. When she grows up she becomes an economic asset. The father is reluctant to send the daughter away to her husband's village. He does not mind her licence in sexual matters so long as this is confined to the village. Intrigues with persons belonging to the same clan are not encouraged but there is not much restriction as regards those belonging to other than the clan of the girl. When the husband finds that she does not want to come to live with him, he demands repayment of bride price he has paid; of course, he takes this final step after he has tried his utmost to persuade the wife's people, for even if he has made a small cash payment he has spent a lot in kind and in entertainment.

The girl's father does not worry himself much about this demand, for if the girl is handsome-looking, she is sure to be demanded by another party who will pay the dowry back to the first husband and some amount to him as well. Whether he keeps the girl at his house or marries her a second time, he is a gainer in either case and these considerations have something to do with the many cases of *Chhut* and of strained relations between different villages. Where the girl is not handsome or does not receive proper care and indulgence in the parents' house, the parents do not prevent her going to her husband's house, for, in that case, they do not get willing assistance from her and lose the part of the dowry payable by the husband. Where there is no difference in status between the parties to a marriage, the girl is not withheld from the bridegroom's people, for unless she resides at her husband's place, she is not expected to fulfil the rôle of mother which alone entitles the bride's parents to receive the other half of the bride price. Girls even after their marriage come back to the village of their parents to assist them in field work during the harvest season and the sex licence that obtains in Jaunsar-Bawar during the festivals when even married girls

misbehave is understandable on this account. In the village of her husbands, adultery is a crime of the gravest magnitude and a wife guilty of such offence pays the penalty in no uncertain way. If she still remains in her husband's house, she is ill-treated by the family and is denied any sympathy by the village. This raises the question of morality in Jaunsar-Bawar. A woman has two standards of morality to conform to, one in her parents' house, one in her husbands'. In her parents' house she is allowed every kind of liberty and licence and nothing is an offence unless specifically prohibited. In case any child is born out of extra-marital relationship, the husbands concerned have to own it and this they do without much heart searching on account of the small number of children among the Khasas. Usually, the child is fathered on the eldest of the husbands of the woman. It was customary in earlier days, and even today it is in the interior, for girls (conforming to the social etiquette of the family) to offer themselves as bed-mates to guests of the family who may have no scruples in this matter. The rules of hospitality allow that grown up daughters of the family, married or unmarried, should cater to the comforts of visitors in every way. But a married girl in her husbands' house must observe strictly the rules of morality, must behave properly, must be faithful and loyal to the group of husbands and strict vigilance is kept on her movements by the family group as well as the village. Everything she does is considered an offence unless specifically permitted. But a wife in one village is a daughter in another and custom allows the wife to go to her parents' village where she may take advantage of this double standard of morality.

The usual explanation offered by the Khasas is found in popular sayings and proverbs which compare a girl after marriage to the carcase of an animal, so that the parents can have no interest in her after her marriage. She lives, they say, for the family of her husbands where her economic contribution is indispensable and thus her morals are no concern of her parents. How far this attitude is born of an original disgust at the transference of allegiance of the girls of a matriarchal society to a patriarchal is an interesting theme for discussion. We shall deal with this aspect later on.

Girls in Jaunsar-Bawar, as we have already pointed above, are married very early. But if the family suffers from some social stigma, or is known to have some hereditary disease, if the gods are known to have been displeased with the family, if some natural calamities had fallen on the family which could be traced to the wrath of the gods, or if the girls of the family are known to have broken faith by not going to live with the husband or husbands, it may happen that suitable proposals for marriage will not be forthcoming and the parents or brothers of the girl have to wait indefinitely for her marriage. A few such cases came to our knowledge during our investigations.

Some examples of polyandry in practice will be of interest in this connection. Hariram, *Sadar Sayana* of village Jadi, has four brothers, the youngest of whom Nain Singh is about 35 years of age. He with his brothers owns 9 acres, 3 roods, and 5 poles of land, 14 cattle and 88 sheep and pays Rs.8 as *malgoozari*. He is therefore quite a man of substance and the richest farmer in the village. Hariram married Gongga and paid Rs.60 as bride price. She proved barren and after 4 years, she was divorced and Hariram got back Rs.20 from her next husband. He married Jimuti, a divorced woman for whom he had to pay Rs.20 as bride price. Jimuti was found to be suffering from sexual disease and was divorced without any demand of part of the dowry. He then married Ashadi and paid Rs.50; she was also a divorced woman but after a couple of years, she died without any issue. The fourth marriage was with Pirudi for whom he paid only Rs.12. Pirudi is living with the family and has three children. Bipu is his fifth wife and has one son. Last year Hariram married Pusuli for whom he had to pay Rs.120 as dowry. She was divorced thrice before she was married by Hariram and has not any issue yet. Thus Hariram has married six wives one after another and between 4 brothers they have four sons.

Narayan, son of Hariram (for he is the eldest of the sons and thus was fathered upon Hariram), lives with his brothers and has married 3 wives. For the first wife Nagu he paid Rs.12 but Nagu died without issue. His second wife was Bardai who also was paid Rs.12 as bride price. She gave birth to two daughters but was later on divorced. The third wife, Chakeri was paid a dowry of Rs.120 as she was married after her second divorce. She has two sons living. Narayan's eldest daughter was first married to Jowar Singh who paid Re.1 as bride price but Pusu was divorced and the second husband had to pay Rs.240 to Jowar Singh as compensation.

Madan Singh has two brothers, Narayan and Ajmeru. He with his brothers possesses 4 acres, 1 rood and 30 poles of land, 8 cows and 44 sheep and pays a *malgoozari* of Rs.5-14. Madan paid Rs.2 as bride price and married Bardai and has 4 children by her. For the next wife he paid Rs.12 but after two years he divorced her and realized Rs.60 from the husband she married later. The third wife, Asuji had to be paid Rs.12 but she also was divorced after a year and fetched Rs.100. The fourth wife of Madan, Jamni, for whom he paid Rs.12 has no issue yet. Thus in this family 3 brothers have married 4 wives and have 4 children between them.

Amar Singh with his 4 brothers has married three wives. For the first wife, he paid Rs.50 as she was a divorced woman. After a year she was again divorced by Amar Singh and the latter received back only Rs.8. Next he married Jhani and paid Rs.10 as dowry. She also was divorced after a couple of years

and he realized Rs.8 from her next husband. The third wife is Rutu who is living with the brothers and for whom he paid Rs.50. They have a son by the present wife. Amar Singh with his brothers owns 2 acres, 1 rood and 26 poles of land, 10 cattle and 36 sheep and pays a fairly high *malgoozari* too. Thus in this family 3 brothers have one son.

Instances like these can be multiplied to show the rate of bride price, the frequency of *Reet* which combines in one transaction divorce as well as second marriage, and the number of wives and children per family. It appears from our investigation in Jaunsar-Bawar that usually the number of marriages is no indication of the plurality of wives for seldom has a family more than two wives simultaneously living together with the group of brothers as husbands. The marriages are usually in succession after the death of wife or after a *Chhut*. A *Chhut* is usually followed by another marriage. Further, the number of children in a polyandrous society is very low, for 4 to 5 brothers between them possess 3 to 4 children and sometimes less. Another fact which is extremely significant is the number of barren women. A husband waits 2 to 3 years to see if the wife provides any issue. If she fails, she feels that she is not much wanted in the family and thus she seeks a new home. If she is not wanted in the house, if she is lazy, or suffers from some form of sexual disease which is fairly common, or if she is guilty of some grave misdemeanour, such as her unwillingness to cohabit with the eldest husband, so long as he remains in the house, she is divorced and the next husband of the woman has not to pay any big sum as dowry for her. But if she wants to leave her husband herself and if she does not suffer from any disease or has already proved her fertility, the husband usually demands an exorbitant price from her fiancé, and this amount must be paid by the latter if he wishes to marry her. In such a case the larger the number of *Chhuts* a woman goes through, the higher the bride price she fetches, for the bride price must provide for compensation to the previous husband and his family.

It is easy to marry a girl of 10 to 12 years and one need not pay any but a nominal bride price, but a woman, who has been divorced thrice or four times, fetches a handsome dowry. A woman of 45 in Bangar village, with 4 *Chhuts* to her credit, was married by her fifth husband on payment of Rs.285 which may sound ridiculous when a girl of 15 or 20 can be married on payment of Rs.20 to 30 only. Investigations have shown that this woman has given one or two issues to every family she was affiliated to by marriage, and as children are very much desired by the people, a woman who has proved her fertility is at a premium. Considering the number of barren women, a woman who gives evidence of her fertility in one family is desired by others so that she chooses to change her husbands whenever opportunities present themselves. Besides with four

to five husbands to cater to, her affections may not be fixed on any, thus her change of family does not produce any great psychological reaction which one would normally expect in a monogamous family. The licence permitted to the girls while they live with their parents, the indulgence they receive from the society, the annual sojourn of married girls in their parents' village during harvesting season and also during festivals, uphold this laxity in morals.

In one of our village surveys in Nada, we were met with many requests for medicine to cure barrenness and we made a house to house inquiry to determine the extent of this disability. The figures we collected were indeed staggering and I should think that along with any scheme of economic uplift a health survey should be immediately undertaken to examine the causes of sterility in the women of the area. Some primitive tribes in India allow premarital licence and women are known to take recourse to indigenous medicines to avoid the consequences of irregular unions and the effects of such nostrums have been manifest in the increased incidence of sterility among them. How far such practices are responsible for barrenness among the hill people affords a subject for inquiry. Besides, in the hills, particularly those in the neighbourhood of cantonments, incidence of sexual diseases is greater than anywhere in the plains and a medical inquiry in the villages of this region will be of great help in determining the extent of sexual disease.

We have said that polyandry is the common form of marriage among the people of the Himalayan region. It is so, as all the cultural groups in this region practise it. But it is also a fact that other forms of marriage are also practised along with polyandry. In one house there may be three brothers with one wife, in the next house there may be an only son with three wives to himself, in the next, three brothers with four wives, so that monogamy, polygyny and polyandry and even group marriage are all practised side by side. Economic considerations have been suggested as the cause of polyandrous marriages. Thus whether a man should have one wife or a group of brothers one wife is said to be 'a matter of means and land'. Economic conditions engender social habits no doubt, and polyandry may be due to the difficulties of existence particularly in the region under investigation. The Gharwalis today do not observe polyandry but the Jaunsaris do. Once I had a talk with a number of Jaunsaris on this subject. I wanted to know why the Jaunsaris still practised polyandry while their next door neighbours the Gharwalis had outgrown this practice. The answer was extremely significant. I was told that they did not envy the Gharwalis. The latter left their homes due to the disintegration of joint families. At first, land in Gharwal was measured by acres, then by roods, then by poles, then by yards and feet till they all left their village and are today

distributed all over the country as domestic servants. The Jaunsaris love their homes and do not want to repeat the experience of their neighbours.

That economic conditions shape the forms of marital relationship we may not doubt, but can a society become polyandrous if polyandry is not the customary form of marriage among the people? The custom of hypergamy which makes it obligatory for a family to confine the marriage of girls within certain limits is a widespread practice in India and elsewhere where two or more races of unequal racial or cultural status have mixed together. It leads to the custom of marrying up as opposed to hypogamy or marrying below. It forbids a woman of a particular group to marry a man of group lower than her own in social standing and compels her to marry in it or above it, while man can marry in the group or below it. If we take a society with three social classes, A, B and C and all hypergamous, we shall find that men belonging to A can marry in A, B and C. Men of the B class can marry in B as well as C. Men of the C class must confine their marriages to their own class. Girls belonging to B can marry in B as well as in A, while girls of A must marry within A. If the sexes are equal in all the three classes, as they usually are, the girls belonging to A will have difficulty in getting married while boys in C will have a restricted choice and therefore will find difficulty in securing wives. In the A group polygyny may develop due to excess of females, in the C group polyandry is a possible consequence due to scarcity of women. But we find that in practice such situation has not developed. Instead in the A class the bridegrooms are at a premium and in the C class brides are at a premium. While in the A class bridegrooms are bought, in the C class purchase of brides is the rule. These customs have not led to the introduction of polyandry.

All of us know how difficult it is for the lower classes and primitive tribes to secure wives as it involves heavy financial commitment for the willing bridegroom, but such castes and tribes have not taken to polyandry. In some tribes if the bride price is not secured it is customary for the bridegroom to serve the family of the bride for a stipulated period so that he may liquidate the bride price by service and become eligible for marriage. Marriage by capture, concubinage, levirate and homosexual practices may be found along with polyandry so that economic conditions or the custom of hypergamy cannot by themselves explain the incidence of polyandry as we find in the Himalayan region.

Attempts have also been made to correlate polyandry to a disturbed balance of the sexes. Westermarck could not find any absolute correlation between them. In the cis-Himalayan region as well as in those areas where polyandry is practised there is an excess of males over females.

JAUN SAR-BAWAR.

Disparity in Sex Distribution in Jaunsar-Bawar from
1881-1931.

	M.	F.	Total.
1881	25,400	19,717	45,117
1891	28,435	22,262	50,697
1901	28,349	22,752	51,101
1911	30,518	24,294	54,812
1921	31,567	24,056	55,623
1931	31,922	24,853	56,775

India is a land of males, for according to the latest available figures regarding the distribution of population by sex, India has approximately 180 million males compared with 169 million females. In many European countries the women are in a majority. At the census of 1901, there were 102,826 males and 75,369 females in the Dehra Dun district and there were 39,611 married women and 56,254 married men during the same period. Figures from other parts of this cultural region will show sex disparity. This unequal proportion of the sexes may have some effect on the form of marital relationship in these parts, but then there is an obvious difficulty in accepting this position. An intensive survey of four villages in Jaunsar-Bawar undertaken by me last year, has given the following data :

Village.	No. of Families.	No. of male children.	No. of female children.	Total No. of children.
No. 1 ..	21	37	31	68
No. 2 ..	26	48	21	69
No. 3 ..	15	24	13	37
No. 4 ..	17	34	30	64
TOTAL ..	79	143	95	238

Thus in 79 families investigated there were 143 males and 95 female children, the proportion being 3 : 2 ; in another group of villages investigated by my student, Mr. H. Meithal, there were 139 male and 83 female children, the ratio of male to female children approximately was 7 : 4.

We have no evidence to prove that female infanticide was freely practised or is practised in these parts. The demand for labour is so high that it is not possible to believe that female

children were put to death. Today in Jaunsar-Bawar, we find that many girls after marriage do not proceed to their husbands' village because their labour is greatly needed in the household of their parents. How far polyandry is responsible for the excess of male children is a profitable inquiry no doubt, but even if we admit the physiological law which produces an excess of female offspring in polygynous animals the reverse process may not be true. Granting it to be true in animals, it does not follow that such result is a necessary consequence of polyandrous matings in man, for man differs from animals in many particulars. How far dietary conditions are responsible for difference in fecundity and fertility and in the determination of sex of children born is a problem which has received little attention. How far viability of sperm in polyandrous unions affects reproduction has not been found. From local knowledge as well as the testimony of the people themselves, it appears that the extent of sexual diseases must have some selective effects on reproduction so that female children are more vulnerable than male and the incidence of male births is necessarily higher in this area. In any case, it is legitimate to suggest that polyandry may not be the consequence of a disturbed balance of the sexes as it may itself produce a disparity in sex proportion as we have already indicated.

Even if biological and economic factors do not explain the origin of the institution of polyandry, they certainly have maintained the institution as it exists today. The origin of an institution may be due to a variety of causes, just as in the evolution of the races, we do not think monogenesis can explain the diversity of types and races. Monogenic theory fails to explain the origin of complex cultural institutions. The status of the first born in the family is an important factor in the life of most of the people living in the Himalayan region. The system of patriarchal family is consecrated by religion in Tibet and also in the cis-Himalayan tracts. The property of the father remains the exclusive property of the first born, he is, however, under the obligation of lodging, clothing and feeding his brothers. When the eldest son of a man marries, the father abdicates his trust and makes it over to the eldest son. Just as the property of the family is owned by the first born but is enjoyed by the other brothers and dependants, the various partners in the joint establishment have a share in the wife of the eldest brother. Such is the principle of Tibetan Jurisprudence that even a father or uncle may live with his son's or nephew's wife and share marital rights over her. The marriage of a younger brother with another woman is considered bigamy as it is incompatible with the principles of Tibetan marriage. We have already referred to the status of the first born in Jaunsar-Bawar and similar evidence has been provided by others who have written on the people living in other parts of the Himalayan region.

Marriage has always been a group contract. Where the sanctity of a marriage is not established it is taken as a means of uniting two families or even two villages or clans. If marriage is a group contract, as it essentially is, the marriage of a woman with a group of brothers is not a unique phenomenon. That the various branches of the Aryan race had practised some such form of marriage can now be readily understood. Briffault, in his 'Mothers', has provided unmistakable evidence regarding the widespread practice of polyandry among preliterate and literate people in precontrol and control days, that is in both savage and civilized societies. But polyandry has existed side by side with other forms of marriage and thus the existence of polyandry in the society does not represent a survival as the historical anthropologists suggested, or even as a stage in the evolution of marriage, for we find it present even today in many parts of the world.

The marital life of Jaunsar-Bawar, as also of the entire Himalayan region is characterized by the inordinate freedom of women. It may be that the economic importance of women has determined the attitude of the people to the marital code, but the laxity of morals, the double standard of morality recognized by the community and the freedom with which marriage ties are annulled and entered into, are difficult to explain from a merely economic standpoint. The frequency of divorce and dissolution of marriage commonly known as the *Reet* has introduced problems extremely tragic in themselves, and an understanding of the implications of the marital life in these parts is necessary before any steps may be taken to remedy the situation. We have already discussed the various possible causes of polyandry in this cultural region and we have found how difficult it is to pin ourselves down to any of the interpretations given above. It appears, however, that the entire Himalayan region particularly the cis-Himalayan tract has its own story to tell about the characteristic social life one meets there, for such problems, as are found there, may be due to contacts between two distinct matrices that still survive in various traits otherwise inexplicable.

Without accepting the theory of unilinear progress of human society it may be said that many of the aboriginal tribes, Australoid or Pre-Dravidian, have passed through a matriarchal stage of culture, survivals of which are found today in couvade, laxity of morals among women and an economic independence difficult to interpret otherwise. The Tharus of Nainital Tarai who represent an aboriginal stock in these parts and who were more widely distributed in earlier days possess certain customs which can be explained as relics of a matriarchal culture.¹ For

¹ Some Aspects of the Matriarchal Culture of the Tharus and Bhoksas of Nainital District, by D. N. Majumdar. *Jubilee Volume of the Journal of the Bombay Anthropological Society.*

example, the women among the Tharus possess certain privileges which are denied to women in most parts of the country. The Tharu women do not allow their husbands to touch the water jars where water for drinking is stored. The Tharu women never salute the men who may stand to them in superior relation, they only bow but never touch the feet of their male superiors. The Tharu women go out to make purchases while their husbands carry them home. The Tharu women are expert painters and their mural paintings consist of pictures and scenes depicting fights and even warriors on horse back. The Census Report of the U.P., 1931, records further peculiarities of the Tharu women. Indian women as a rule proceed to the fields very early in the morning. They have a meal at midday and work till the evening. The Tharu women, on the other hand, go to the fields after a good meal corresponding to an English breakfast. At midday they eat some grain and then return home in time to cook and prepare the evening meal for their men folk. They thus work two to three hours less than the women of other tribes and castes. Again, Tharu women, unlike other women, do not carry paddy seedlings to the fields where they have to be transplanted. The seedlings have to be carried by the men. Other women carry them on their heads, thus saving the expense of a labourer or two. The Zemindars did their utmost to change these conditions, but rather than change their mode of life they chose to leave the fields altogether. The result was a migration of the Tharus to Nepal and other tracts. The women among the Tharus thus wield great authority in social and domestic spheres, and even in the activities of an economic order they have assumed the rôle of leadership. Occupations which are taboo to women in other parts are pursued with consummate skill and enterprise by the Tharu women and even hunting, fishing and fowling are done by them.

The settlement of a purely patriarchal people, like the Indo-Aryans, among a predominantly matriarchal people, viz. the Doms, has certainly led to cultural fusion and acculturation. It is on this assumption that we can explain some of the important traits-complex in the cis-Himalayan region, as for example, the double standard of morality practised by the women. Matriarchal social life is incompatible with rigid rules and taboos fettering the free movement of the women, but patriarchal society cannot function unless the woman is loyal to the family of the husband and thus a conflict arises between duties and rights resulting in a compromise in behaviour patterns as we meet in Jaunsar-Bawar and other parts of the Himalayan region. The latitude granted to a woman in her parents' house is reminiscent of the matriarchal life, while the circumscribed freedom of the wife in her husband's village indicates the ascendancy of the patriarchal code over the matriarchal. Even today a woman returns periodically to her parents' village to

assist the latter in household and agricultural work and during festivals and ceremonies she must come back to her native village to pass the time in the company of her friends and relations on her parents' side. This custom, however, produces an interesting grouping of the village units and is responsible for much of the laxity in morals and peculiar behaviour patterns which characterize the hill community. The exogamous rule does not allow girls of the same village to marry within the village, though extramarital sex relations are possible and are not noted as serious offence by the local group. The girls of the family or village who may belong to two to three generations (as for example, grandfather's sisters, father's sisters and own sisters) are all known by the classificatory term *Dhyanti* and include the prohibited degrees of relationship. The diagrammatic arrangement given below will illustrate the nature of social stratification and grouping commonly met in Jaunsar-Bawar. As the village is usually inhabited by members of the same *Got* or clan, marriage must be arranged outside the village. But even if the village contained more than one clan, marriage within the village group may not be desired on account of the latitude in sex life obtained in the village.

$$\begin{array}{l} X \begin{array}{c} \sigma \\ \varphi \end{array} \left\{ \begin{array}{cccccc} A_1 & A_2 & A_3 & A_4 & \dots & \dots \end{array} \right\} \left\{ \begin{array}{cccccc} B_1 & B_2 & B_3 & B_4 & \dots & \dots \end{array} \right\} \\ \quad \quad \quad \left\{ \begin{array}{cccccc} b_1 & b_2 & b_3 & b_4 & \dots & \dots \end{array} \right\} \end{array}$$

$$Y \begin{array}{c} \sigma \\ \varphi \end{array} \left\{ \begin{array}{cccccc} A_1 & A_2 & A_3 & A_4 & \dots & \dots \end{array} \right\} \left\{ \begin{array}{cccccc} B_1 & B_2 & B_3 & B_4 & \dots & \dots \end{array} \right\} \\ \quad \quad \quad \left\{ \begin{array}{cccccc} a_1 & a_2 & a_3 & a_4 & \dots & \dots \end{array} \right\} \left\{ \begin{array}{cccccc} b_1 & b_2 & b_3 & b_4 & \dots & \dots \end{array} \right\}$$

If we take two villages between which marriages are usually arranged and if we denote the males of one village as $A_1 A_2 A_3 \dots$ and the females as $a_1 a_2 a_3 \dots$ and the corresponding units in the other village as $B_1 B_2 B_3 \dots$ and $b_1 b_2 b_3 \dots$, X would give the normal arrangement of units for an exogamous village, but the second situation, viz. Y arises on account of the social custom of the periodical migration of *Dhyantis* from their husbands' village to that of their parents. This periodical exodus of women in these parts is a compromise trait that owes its inception to the impact of cultures and not to the economic necessity of assisting parents as would be superficially evident.

There are other traits which point to a fusion of cultures already indicated. For example, when a matriarchal society comes in contact with a patriarchal and a miscegenation takes place between the people of these diverse cultures property consideration makes it necessary for children to be affiliated to the parent who owns the property. Thus metronymic designation is found with matrilocal residence and matrilineal inheritance, as otherwise the children would not be cared for by the patriarchal group to which the father may belong. So the children of a woman who leaves her matriarchal moorings and comes to live with a man of the patriarchal society must

receive patronymic designation or in default some arrangement should be made by the community to allow them to inherit some part of the property of their father or mother. But a compromise trait may develop as it has in Jaunsar-Bawar and neighbouring hill States, which makes it possible for a Bhat (or Brahmin) or a Rajput, for example, to remain a Bhat or a Rajput even when he marries a Kanet girl, the children, however, are called *Sarteras*, though it is possible for the latter to regain the status of the Bhat or Rajput after two to three generations. A Bhat or a Rajput is not allowed to marry a Koli girl or any girl belonging to the artisan castes who are recruited from the Dom element. Should a Bhat or a Rajput girl marry a Kolta or Dom, the children must be affiliated to the father's caste and receive patronymic designation. Sex relations are allowed, but strict rules are in force prohibiting any social intercourse between a Brahmin or Rajput, and Kolta or Dom woman. A Brahmin or a Rajput may even be allowed to keep a Kolta woman as his mistress, but he should not be seen to smoke or drink with her. When a Bhat girl marries a Kanet in the Sirmoor State, she becomes a Kanet, but if a Kanet girl marries a Bhat she may remain a Kanet or become a Bhat.

In the matter of inheritance also we find that the hill code differs materially from that of the orthodox Hindu, as it allows a woman to inherit her father's property in the absence of any male issue by the same father. So long she remains unmarried or even after marriage should she reside with her husband in her father's village, she can own and use the property in anyway she likes. If she leaves her house and proceeds to live with her husband, she forfeits her claims to the property which passes on to the collaterals. A widow in Kulu and other areas can inherit the property of her deceased husband and even keep a partner to live with her in her husband's house though she cannot formally marry any one and retain her life title to the property at the same time. Not only in the economic sphere but in the matter of sex the woman is given an inordinate latitude incompatible with the patriarchal code. In Sirmoor and other Punjab Hill States where polyandry is the prevailing form of marital relationship, the joint wife sleeps with all brothers in the same common house or dormitory and complete freedom is allowed to the wife to choose her mate for the night. She naturally makes her choice earlier in the day in consultation with her husbands, but she does not usually bestow her favour in such a way as to arouse suspicion about her intimacy with any particular husband. The joint wife by tradition and upbringing knows her responsibility and meets the wishes of her spouses as best as she can. Enquiries on this subject have elicited frank answers from the wives and it may be mentioned as a general rule that a wife may sleep with a particular husband every night but must also meet the demands of the other husbands by turns. A

number of girls admitted that they were fond of one of the husbands but they did not object to having sex relations with other husbands if and when they wanted them. When asked why they did not live with the husband they were fond of instead of living as the spouse of the other husbands as well, they did not think it was necessary as the other husbands did not grudge her freedom in this respect. When economic conditions improve and the head of the family can spend some money over the purchase of another wife she does not object to a second wife and some wives have confessed to us that for years they have been living under monandrous conditions.

The importance of the maternal uncle in a patriarchal society where cross-cousin marriage is not popular, furnishes another argument for a matriarchal matrix in these parts. The mother's brother has an important rôle to play in the marriage of his nephew or niece. It is he who finds out mates for his sister's children. He arranges the ceremony, manages the function and receives presents from friends and relations. As child marriage is very popular in the hills, the child bride is carried on his shoulder by the maternal uncle and when the couple return to the house, it is usually the maternal uncle who supervises the propitiation of spirits and the worship of benevolent gods and goddesses.

Thus we find that the superimposition of a patriarchal culture on the matriarchal matrix has been responsible for many of the traits characteristic of this cultural region. The feudal system which still survives in this part largely accounts for an elaborate territorial organization based on a confederacy of *Thokdars* or *Sayanas*, and also consequent desire to concentrate power in the senior male member of the family. These have given rise to a rigid code of joint living and co-partnership and may have sanctioned the prevailing type of marital life in these parts.

In our description of the physical features of the Khasas we had emphasized the fact that the hill people do not represent an undiluted stock and the Doms have received Khassa infiltration. The physical features of the artisan castes, such as the Bajgirs, the Koltas, the Oadhs and others, provide ample proof of this fact. But the hypergamous practice of the Khasas has prevented the Khassa girls from marrying the Doms while the Dom girls married to Khasas did not receive Khassa affiliation. Nor did the Khassa girls marrying the Doms or members of the artisan castes retain their castes. So that the intermixture of the two people on the one hand prevented much dilution of Khassa blood and on the other contributed to great admixture among the Doms. It is not improbable, however, that polyandry would be hailed as a welcome means of keeping the Khassa blood free from wholesale contamination though Khassa infusion must have contributed to a large scale admixture among the inferior

groups. The peculiar economic conditions of the hills and the biological factor of sex disparity where it exists have no doubt largely determined the form and functions of the traits-complex, but had it not been for the matriarchal matrix the polyandry of the Himalayan region would not have assumed the importance it possesses.





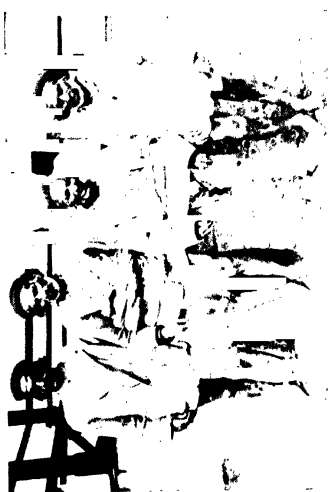
1. A Hill View showing the terraced fields and the valley.



3. A Group of Khasa-Rajputs and Khasa-Brahmins.



2. A Khasa Woman working in the field.



4. A Group of Khasa-Rajputs of Jadi, Jaunsar-Bawar.



A Jaunsar Belle of Lakha Mandal,
Chakrata Sub-Division.



6. A Beautiful Khasa Woman of
Nada, Chakrata Sub-Division.



7. A Khasa Girl in her Bridal Dress.



8. A Group of Child Brides.



9. A Couple of Khasa Women Married to a Group of Brothers.



10. A Polyandrous Family with a daughter on the eve of her departure for her Husbands' village.

Notes on the Life and Labours of Captain Anthony Troyer.

By SIR AUREL STEIN, K.C.I.E.

During the laborious years, 1888–1899, spent by me at Lahore I devoted whatever scanty leisure could be spared from teaching duties and exacting administrative work, to the task of critically editing, translating and annotating Kalhana's *Rājataranginī*, the oldest extant Sanskrit Chronicle of the Kings of Kashmir. In the course of these protracted labours supplemented by such antiquarian tours in Kashmir as vacations allowed me to make, I became necessarily interested in the person of Captain Anthony Troyer, a predecessor in this difficult task. His career had been very varied, and his life had been spent in many lands. Returning after two prolonged periods of service in India, first at Madras and after an interval of more than ten years at Calcutta, he published in 1840 at Paris an edition of the Sanskrit text of the first six cantos of the Chronicle with a French translation under the auspices of the *Société Asiatique*.¹ Twelve years later he followed this up with a translation of the remaining two cantos containing the greater portion of the work, an *editio princeps* of the whole of the text having been printed in 1835 at Calcutta.

Kalhana's 'River of Kings', as practically the sole extant product of Sanskrit literature possessing the character of a true chronicle, was bound to attract attention ever since European scholars became aware of its existence. Moorcroft, that intrepid but ill-fated explorer, had shown zeal and judgment when during his stay at Srinagar in 1823 he secured a copy from the oldest then known manuscript. But the *editio princeps* produced from it at Calcutta in 1835 was far too defective in many respects to serve for a serious interpretation. The grave shortcomings of Troyer's effort based on the same materials have long ago been recognized by all qualified Sanskrit scholars. The patient industry and perseverance of the aged scholar might well claim recognition; but there could be no doubt that the great Indologist, Professor George Bühler, was justified in

¹ *Rajataranginī—Histoire des rois du Kachmir*. Traduite et commentée par M. A. Troyer, Membre des Sociétés Asiatiques de Paris, Londres et Calcutta, et publiée aux frais de la Société Asiatique. 1840. Paris. Vols. I, II.

Vol. II contains in its second part an 'Esquisse géographique et ethnographique du Kachmir, ancien et moderne'.

judging that Troyer had undertaken a task very much beyond his strength.

This failure was due largely, as I have explained elsewhere,¹ to the insufficiency, in general, of the materials available to European scholars at the time, and in particular to the fact that for the full comprehension of Kalhana's narrative such familiarity was needed with the topography, physical and economic conditions, and other local features of Kashmir as could not be obtained from outside then or since. But the shortcomings of the translator and commentator are still more readily understood—and excused if account is taken of Troyer's career and his preceding work in fields wholly different from Oriental research. It is the distinct interest presented by Troyer's personality and life which prompts me to record here what information the help received from a revered teacher, a War Office now defunct, and two kind friends has enabled me to gather from widely disparate sources in the course of decades.

It was from a fairly detailed obituary notice contained in the Annual Report presented in 1866 to the Société Asiatique by its Secretary M. Jules Mohl,² the distinguished Orientalist scholar, that I first became acquainted with the main outlines of Troyer's singularly varied life story. As Mohl tells us in the introductory remarks of this notice, the information he recorded was based solely on his recollections of conversations with Troyer when the latter, arrived at a very great age, was leading a life of studious seclusion at Paris. Mohl took care to warn his readers that these recollections were incomplete and might prove inaccurate on some points.

This warning, as we shall see, has proved justified in the light of later enquiries. It had been emphasized by that great Sanskrit scholar, Professor Rudolf von Roth, my master, when in 1893 in response to my enquiries about Troyer he showed me the great kindness of copying out with his own hand Mohl's notice. Roth, when working in Paris in 1845-6 under the guidance of Burnouf, had occasion to meet Troyer. He remembered some quaint features in the habits of the old gentleman who in his retirement was *inter alia* fond of putting his birth even earlier than that indicated in Mohl's notice. This would have made him nearly a centenarian at the time of his death. Roth's critical sense duly recognized the need of controlling Mohl's recollections by a search elsewhere for data

¹ *Kalhana's Rājataranginī*. A Chronicle of the Kings of Kashmīr, translated with an Introduction, Commentary and Appendices, by M. A. Stein. Archibald Constable & Co., 2 vols. quarto. Westminster, 1900. See Vol. I, pp. ix sq.

² See *Rapport Annuel fait à la Société Asiatique* par M. J. Mohl, Paris, 1866, pp. 13-18.

concerning Troyer's chequered life. But owing to absorption in my subsequent Central-Asian explorations and labours in other fields the opportunities for this came to me only after years. Hence in a note to the preface of my annotated translation of the *Chronicle*¹ I could do no more than reproduce an abstract of the essential statements contained in Mohl's biographical notice.

It is probable that even now additional facts of some interest concerning Troyer's life and manifold contacts in widely separate spheres might be brought to light from different sources. But since now the kindness of my friend Colonel R. H. Phillimore, late of the Survey of India, has recently made me acquainted with the result of his researches, illustrating what must be considered by far the most important portion of Troyer's life work and one hitherto left unnoticed, it seems time to sketch here what we know at present of his strangely diverse career.

According to Mohl's story Anthony Troyer was born in Austria about 1769 and having received his education in a military institution left it as an artillery officer. During the campaign of 1792 in Flanders he was stationed in an abandoned monastery and by a curious incident there was led first to Oriental studies. One day he found his artillery men about to make up cartridges for their guns with pages torn from a fine polyglot bible. Having saved the volume from their hands he beguiled his leisure with the study of an Arabic version of the New Testament. After his transfer to the Austrian army in Italy he was attached, evidently as liaison officer, to the English naval force co-operating at the siege of Genoa in 1800. In this capacity he made the acquaintance of Lord William Bentinck, and this changed the whole course of his life. Lord William Bentinck formed a friendship with the capable young officer and on his appointment as Governor of Madras in 1803 brought him out to India as a member of his staff. For this purpose, as Mohl tells the story, it was necessary for Troyer to hold a commission in the British army. So he was provided with a captaincy in a Ceylon Rifle Regiment about to be raised. He is said to have promptly sold his brevet and to have then proceeded as a retired officer to India with Lord William Bentinck. In Madras he then was, so Mohl tells from recollection, officially charged with a course of instruction in mathematics and thereafter became Principal of the Muhammadan College.

Vague and slightly anecdotic as this information about Troyer's start in life seemed, it was sufficient inducement to take the chance of my passage through Vienna in September, 1902, of making an enquiry at the Austrian War Office as to

¹ See Stein, *Kaṭhaṇa's Rājatarāṅgiṇī*, etc., Vol. I, p. x. note 7.

what might be found in its records about Captain Anthony Troyer. The result to my pleasant surprise was the receipt of authentic information unexpectedly prompt and detailed. When addressing my verbal request to the officer to whom I was directed in the Historical Section of the War Office he at once declared himself quite familiar with the name of Captain Anthony Troyer and his career also, as far as it had lain in the Austrian army.

There on his table lay a file concerning the planned publication of the materials contained in a history of the campaigns fought in 1794 by the Austrian forces in the Low Countries, Germany, and Italy, which Troyer had prepared in five foolscap volumes. On account of its excellence this history was declared in 1816 a model for similar official records of campaigns. I regret that I have since taken no steps to ascertain whether and when the intended publication of Troyer's work actually took place.

It was a curious play of chance when two days later by the courtesy of the Imperial and Royal 'Kriegs-Archiv' there was placed at my disposal a detailed and fully authenticated record (No. 2036 and No. 568, dated September 25th, 1902) of Troyer's career in the Austrian service. It comprised the time from his entry into the Military Academy at Wiener-Neustadt, founded by, and called after, the Empress Maria Theresia, until 1803 when his application for two or three years' leave to accompany the newly appointed Governor of the Madras Presidency was granted. Of Troyer's life after his departure for India nothing was known to the Historical Section of the Vienna War Office. Hence the succinct account I could in return furnish relating to his employment in the East India Company's service and his scholarly work later was welcome.

It is from that official record, provided with all needful references to the original documents, that I glean the following essential data. Anthony Troyer von Aufkirchen was born in 1775 at Klattau in Bohemia. This fact proves that his age at the time of his death, as recorded in Mohl's notice, was distinctly overestimated and confirms the doubt Professor von Roth had expressed on this point when writing to me on February 26, 1893. Troyer was the son of Lieutenant Joseph Troyer von Aufkirchen, of the Austrian Dragoon Regiment Josias Prinz zu Sachsen-Coburg-Saalfeld. In 1787 he was admitted into the Military Academy at Wiener-Neustadt, a famous institution which as long as there was an Austrian army, supplied the élite of its corps of officers. In 1791 he received his first commission as cadet-ensign in the Infantry Regiment No. 38 and was promoted in the same first to Ensign and then in 1793 to Second Lieutenant.

He took part with his Regiment in the campaigns in France, the Low Countries and on the Rhine, and was wounded

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near Valenciennes in 1793. Attached to the Quarter Master General's Staff he greatly distinguished himself during the actions fought in 1795 near Düsseldorf and, in consequence, was in that year promoted to First Lieutenant on the Quarter Master General's Staff. On account of illness he did not take part in the campaign of 1796, but served in the following year in the Rhine army. In 1798 he was ordered to Italy for survey work, was subsequently attached to the army operating there and was wounded at the battle of Novi in 1799. Meanwhile he had received promotion as Captain in the Quarter Master General's department. He served during the campaigns of 1800 and by May 1801 was appointed to the newly established 'War Archive' or what corresponds to the Historical Section of a modern War Office. It was during this employment that Troyer was charged with preparing the record of the campaigns of 1794 in the Low Countries, Germany, and Italy, above referred to, the value of which was specially eulogized years later.

After nearly two years' work in that post Troyer applied for two or three years' leave in order to accompany Lord William Bentinck who had invited him to proceed to India as a member of his household. As he explained in his application, he could hope there to acquire a competence and therefore would renounce any claim upon future provision by the Austrian Government. His application was duly granted by an imperial resolution of February 23, 1803. In order that his post on the Quarter Master General's Staff might be filled he was transferred without pay as 'supernumerary on leave' to the Infantry Regiment No. 49. As he did not return from leave and no information about him was received, his name was at the Regiment's request removed from its cadre in March, 1809.

The record here reproduced affords ample evidence that Troyer's career as a young officer in the Austrian army, comparatively short as it was, had offered him opportunities to distinguish himself in the field and to display marked intellectual abilities. His four years' training at an early age in the foremost military institution of old Austria was bound to have played a chief part in developing them. It may safely be assumed in particular to have laid the foundation to his scientific knowledge of surveying methods and practice.

This, as we shall see further on, enabled him in Madras to render very important services to the army in India, by providing its first staff of officers specially trained for systematic topographical survey work. In this respect the reference in the record to his employment on topographical surveys in Italy is of special interest. It proves that as a young officer on the Quarter Master General's Staff, for which he, no doubt, had been selected on account of his superior training and mental capacity, he had opportunities to acquire practical experience in survey

work with the plane-table. The use of this he was to be there-after the first to introduce for surveys in India.

The record makes no mention of the special circumstances which during the Italian campaign of 1799-1800 offered the opportunity for Troyer to come to the notice and acquire the friendship of Lord William Bentinck. On the strength of Troyer's recollection as reproduced in M. Mohl's notice, it may safely be assumed that it was the siege of Genoa in 1800 by the Austrian army under General Melas which by chance determined the whole course of Troyer's subsequent life. Lord William Bentinck, then a youthful Colonel, was attached as the military representative of England to the Austrian army in Italy during the years 1799-1801.¹ As such he was, no doubt, present before Genoa when the strongly fortified city, blockaded from the sea by a British naval force, was ultimately surrendered by Masséna owing to famine among its population.

If Troyer was acting as a kind of liaison officer between the Austrian army before Genoa and the British naval force he would have been bound to be often brought into contact with Lord William Bentinck. His abilities could scarcely escape so good a judge of men as Lord William Bentinck proved all through in the high offices which he was destined to fill. It may, perhaps, be conjectured also that Troyer's linguistic talents, as amply displayed later in his Indian studies, and indicated by the story of Mohl about his interest first aroused in Arabic, attracted Lord William Bentinck's attention. Troyer's selection as liaison officer with the British command may well have been due to a knowledge of English, an accomplishment probably very rare in those times among Austrian army officers.

The exact information secured at Vienna about the early part of Troyer's career induced me next to apply to Mr. (now Sir) William Foster, C.I.E., late Superintendent of Records at the India Office, for data concerning Troyer's later employment in India. That ever helpful friend was kind enough to furnish me on December 5th, 1902, with a memorandum based on the records of the East India Company but not intended for publication as it stood. From this it was seen that Troyer accompanied Lord William Bentinck to Madras in 1803, having been provided, probably through the latter, with a commission as Ensign in His Majesty's 12th Foot. He was not attached at that time to the Governor's Staff.

¹ See Boulger, *Lord William Bentinck*, Oxford, 1892, p. 16. The interest subsequently shown by Lord William Bentinck in Troyer might, perhaps, be partly accounted for by what Boulger states in a note: 'In one of his despatches, he (Lord William Bentinck) bore eloquent testimony to the valour and devotion of the Austrian army, which he found far too few to appreciate it. "It is impossible to do justice to the valour and perseverance of the Austrian army," he wrote.'

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In 1804 Lord William Bentinck proposed a plan for the establishment of a class for the special instruction of a certain number of cadets in topographical surveys. This proposal having been accepted by the Council, Major General Dugald Campbell, Commander-in-Chief at Madras, on November 12th, 1804, nominated, probably at the prompting of the Governor, 'Ensign Anthony Troyer, of His Majesty's 12th Foot', as Drawing and Mathematical Instructor for this class. This nomination was promptly followed on November 13th by his appointment to the post on a salary of 250 Pagodas per mensem. The plan and Troyer's selection for the post were finally confirmed by the Court of Directors on the 30th July, 1806, Troyer having meanwhile been promoted to the rank of Lieutenant.

The class soon developed under Troyer's direction into the Madras Military Institution. In a Military Letter, dated 24th October, 1808, as quoted in Sir William Foster's memorandum, the Madras Government speak highly of the results of the establishment of the Institution and praise the 'zeal, attention and ability' of Lieutenant Troyer. From this and other more incidental references to Troyer's work at Madras quoted in Sir William Foster's memorandum, it became abundantly clear that his activity during the first period of his Indian service soon fully justified the judgment displayed by Lord William Bentinck in bringing his friend to India and in providing for him a field of work worthy of his capacity and to the advantage of Government.

But it was only when I turned lately to Colonel R. H. Phillimore for any information which, as a late Officer of the Survey of India, he might be able to trace about Troyer's activity at Madras, that I became aware of the importance which must be claimed for it. For several years past Colonel Phillimore has been engaged on a full history of the Survey of India, that great department of the Indian Government which for nearly a century and a half has rendered very notable services not only to the administration of the sub-continent but to geographical research over a still vaster area of Asia. In the course of painstaking search in the archives of the Madras Government he collected much interesting information about the working of the Madras Military Institution which owed its creation to Lord William Bentinck's initiative and its success to Troyer's zealous direction. From this I have been enabled through Colonel Phillimore's kindness to gather the following data.

"Stimulated by a recommendation made in 1804 by the Surveyor General in Bengal to the Bengal Government, the Commander-in-Chief at Madras, General James Stuart, had urged his Government that more officers should be trained as Surveyors in order to facilitate the extension of surveys into the unmapped territories added to the Presidency since the defeat of Tipu in 1799. Lord William Bentinck took up the matter

with enthusiasm and in a minute of September 24th, 1804, proposed that 'a select number of the Gentlemen Cadets at Tripasore shall be instructed in the art of topographical surveys by an instructor capable of giving the double lesson in Geometry and Military Drawing'. The suggestion having been accepted by the Council the succeeding Commander-in-Chief at Madras, General Dugald Campbell, recommended the appointment of Ensign Troyer, of His Majesty's 12th Foot, to the proposed post. To this he soon after added the significant recommendation that 'the plan in question having originated with the Right Hon'ble the Governor, . . . the first arrangements of it may take place under His Lordship's superintendence', as stated in the Madras Military Consultations, 13th November, 1804.

"The Military Seminary" was thereupon established, and Lord William Bentinck laid before Council on November 17th, 1804, detailed regulations for the conduct of the Institution, together with a 'plan of instruction'. It was to include from the start 'the practical part of surveying with the plane-table'."

The promptness, unusual in those days and parts, with which these regulations were prepared strikingly illustrates the keen interest with which the Governor followed up the scheme. That its inspiration came largely from Troyer is definitely indicated by the mention of practical surveying with the plane-table, a method not applied then in India but of well-established use where Troyer had received his own training.

"By April 1805 the first class of cadets passed into the Institution and like those which until 1814 followed annually in succession remained for two and a half years under instruction. Troyer's first report submitted in October, 1806, shows the extent of the scientific instruction imparted and refers to specimens of drawings of survey work done by the cadets in the field as 'exhibited every month to your Lordship'. In May 1807 Troyer submitted a long review of the course of instruction to Lord William Bentinck. A memorandum on this course and the future employment of the officers trained was submitted by him after Lord William's departure in that year and was favourably commented upon by Lambton, the founder of the Indian Trigonometrical Survey, the Astronomer at the Madras Observatory and the Quarter Master General at Madras to whom it was circulated.

"In December 1807 Troyer's hands were strengthened for the purposes of discipline by the Institution being placed under the control of the Quarter Master General under whom it still remained after the establishment of a Surveyor General at Madras.¹ In a report to Government submitted in 1808 Troyer

¹ Information extracted by Colonel Phillimore from the Madras Military Consultations and kindly communicated to me helps to throw light on this step. It illustrates the personal interest which Lord William

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indicates his intention of giving lectures also on 'those astronomical problems which are in the strictest connexion with geography and of the greatest practical use'.

"The partial withdrawal of the East India Company's trading privileges by the Act of 1815 induced the Court of Directors to effect reductions in their Indian establishments. A despatch addressed by them to Madras on 5th May, 1815, ordered, among other economies, the abolition of the Military Institution, on the ground that the existence of a similar institution in England rendered the Madras one superfluous. Sir Thomas Hislop, Commander-in-Chief at Madras, recorded a protest (15th January, 1816) strongly emphasizing 'the great mass of geographical and topographical materials with which... the students of the Madras Institution have enriched the records of the Company and in some instances of the civilized world'. It points out the great value of the scientific training imparted to young officers, also that in the course of it 1,620 square miles on the average had been annually and most minutely surveyed. Stress is laid on the services rendered by pupils of the Institution when attached as Surveyors to successive expeditions outside India they 'compiled the best map of the countries between the Indus and the Nile that has ever yet been given to the world' and produced topographical information of the utmost value in territories as widely apart as the Deccan and Java.

"The Governor and Council, however, decided that the orders of the Court of Directors left them no discretion in the matter, and a General Order was approved abolishing from the 31st May, 1816, the Military Institution and the Survey branch of the Quarter Master General's department. At the same time

Bentinck continued to take in the Institution created under his auspices and indicates also a characteristic feature of Troyer's personality. After Lord William Bentinck had left Madras in 1807 Mr. William Petric, the acting Governor, proposed that steps should be taken for the better maintenance of discipline at the Institution, Bentinck's supervision no longer existing. 'Discipline would be much better maintained if entrusted to Troyer who is always on the spot.'

It was accordingly proposed to give to Captain Troyer the appointment of Assistant to the Quarter Master General. After noting that Troyer had hitherto been in no way responsible for the discipline of the pupils, the minute states: 'Every praise is no doubt due to Captain Troyer for the universal satisfaction which he seems to have given to the Gentlemen who were placed under his tuition; but probably he would not have been less fortunate, had he, at the period of his first appointment, been invested with more extensive authority.' Troyer's appointment as A.Q.M.G. 'placing him ostensibly under the first public officer of the Army, will no doubt (combined with the mildness of his manners) give him sufficient weight to maintain discipline'.

It does not appear from the records consulted by Colonel Phillimore that "Troyer ever signed himself, or was listed, as A.Q.M.G. But he is hereafter frequently designated Superintendent of the Institution, which title was probably recognized as covering his complete responsibility, in addition to being Instructor".

testimony was borne to the excellent way in which Captain Troyer and his staff had carried out the duties entrusted to them." The lasting value of the work directed by Troyer and its far-reaching effect upon the topographical surveys carried on since all over India and great adjacent regions by the Survey of India are thus summed up by Colonel Phillimore, its very competent historian.

"During the 11 years that the Military Institution existed, it remained under the charge of Troyer and he was entirely responsible for the methods of survey in which the pupils were taught and trained. Survey was carried out by plane-table on the scale of 4 inches to the mile. The plane-table survey was based on triangulated points as fixed by Lambton's triangulation, minor triangulation being carried out by Troyer or the more senior pupils. Where surveys extended beyond the area covered by Lambton, special triangulation was carried out by Garling, Troyer's most successful pupil.

"Survey by plane-table was thus introduced as a regular method of survey for the first time in India by Troyer, and all officers of the Madras Military Institution were thus brought up to regard it as the normal method of survey. Through the influence of the officers of the Institution the plane-table was, about 1824, declared to be the standard instrument of survey for all Madras surveys The methods taught by Troyer gradually extended to the Bengal Presidency as Madras trained officers were eventually brought up to Bengal

"The choice of Anthony Troyer as Instructor for the Madras Military Institution was a most happy one and of particular interest. Starting the surveys of the Institution shortly after Lambton had completed his first series of triangles along the Madras coast, he was able to introduce for the first time into India the soundest principles of topographical survey, breaking down the main triangles of the trigonometrical survey by his own minor triangles and filling the detail by plane-table, laying out the plane-table sections in a continuous rectangular grid. Holding the post of Instructor for eleven years he trained a large number of officers in this system which in its main principles has persisted to this very day."

There can be no doubt that the work done by Troyer at Madras was by far the most important achievement of his life. Yet he seems, if we may judge from Mohl's very scant reference to it, to have been strangely silent about it in the communications of his retired old age. But about a personal aspect connected with his employment at Madras the official records consulted by Sir William Foster at the India Office supply some interesting information. As it throws light on Troyer's position and also curiously illustrates military procedure at the time it may be quoted in full.

“Lieutenant Troyer had not as yet joined his regiment (His Majesty’s 12th Foot), and as the Commanding Officer had resolved not to recommend him for a Captaincy unless he did so, he caused a letter to be written on 7th February, 1812, from Port Louis, Mauritius, where the regiment was then stationed, summoning Troyer either to join or to exchange into some local regiment. On 16th September, 1812, Troyer forwarded this letter to the Commander-in-Chief at Madras, and asked for instructions. In doing so he stated that he was extremely desirous of remaining in his present post without losing his position in his regiment.

“The Commander-in-Chief replied that he had no power to give leave of absence from a regiment not under his command, but he would write to the General Officer Commanding at the Isle of France and also to H.R.H. the Duke of York at home, requesting that leave of absence might be granted to Troyer without detriment to his promotion. This reply was communicated (27th September, 1812) by the latter to the Officer Commanding his regiment, with the request that the indulgence already shown to him might, if possible, be extended until he should have obtained the rank of Captain.

“On 1st April, 1813, he received a brief answer, dated 11th November, 1812, to the effect that the Officer Commanding could not grant him any leave whatever; that he had now been returned as ‘absent without leave’; and that the Duke of York had approved of his being passed over in a recent selection for a captaincy. Troyer thereupon forwarded the correspondence to the Governor of Madras, pointing out that possibly the matter might yet be reconsidered, as evidently a decision had been taken before the arrival of the promised letter from the Commander-in-Chief at Madras, but stating that if his promotion in his Corps were incompatible with his retention of his post at the Military Institution, he should not hesitate to give up his prospects in the army and rely upon the favour of the Madras Government.

“The Government of Madras addressed a letter to the Governor of the Isles of Mauritius, Bourbon, etc. (11th May, 1813) apologizing for having detained Lt. Troyer from his duty; eulogizing his services and intimating that the Court of Directors would be asked to arrange if possible for the continuance of his employment at Madras. The Court of Directors was addressed accordingly (25th August, 1813).

“Nothing further on the matter has been traced; but it appears from the (British) Army List of 1814 that Troyer was appointed to the 4th Ceylon Regiment, the date of his regimental rank being given as 15th July, 1813. He was placed on half-pay on 25th July, 1815 (Army List of 1824) and remained so till his death.”

From Mohl’s notice it is known that Troyer while at Madras had married a French lady at Pondicherry; at what date is not

stated.¹ This explains the record contained in the Madras Military Consultations of 15th June, 1816, as kindly communicated by Colonel Phillimore: 'The Commander-in-Chief . . . at the earnest request of Captain Troyer permitted that Officer to accompany his family to Pondicherry, where he proposes to reside until an opportunity shall occur for proceeding to Europe.' Colonel Phillimore adds the information that Troyer was probably still in India when Mackenzie left Madras in July 1817; for Mackenzie writes to Mountford in October 1818: 'What is become of Capt. Troyer? Recommend me to him.'

That Troyer during his employment at Madras took up the study of Indian languages can safely be concluded from Mohl's statement that he studied there Tamil, Hindustani and Persian. But there is no evidence of his having ever been in charge of the Muhammadan College there, as Mohl indicated. But his reference to Troyer having at Madras commenced a translation into German verse of episodes from Firdausi's great epic, the *Shāhnāmāh*, may be accepted as correct. Mohl was bound to have been specially interested in this proof of Troyer's Persian study as he himself published later a monumental edition and French translation of Firdausi's *Shāhnāmāh*. He declares to have had portions of Troyer's manuscript version in his hands. It deserves also to be noted that the 'plan of instruction' for the Military Institution, which was proposed in 1804 by the Governor (Madras Military Consultations, November 17th, 1804) and was probably drawn up under Troyer's inspiration, specifies 'one of the native languages' in the first place among the subjects to be taught.

It is much to be regretted that we have no definite information about the years spent by Troyer after his retirement to Europe after 1817. According to Mohl he lived with his wife at Paris, continuing his Oriental studies '*dans une retraite silencieuse*'. It would be interesting to know something about the contacts he might easily have formed there with that leading master of Oriental studies, Sylvestre de Sacy, and other French scholars of note. It would be, perhaps, still more useful if evidence could be traced as to the way in which personal touch was maintained by Troyer with his friend and patron Lord William Bentinck.

That this contact, so important for Troyer's life, remained unbroken after Lord William Bentinck's departure from Madras and also during Troyer's subsequent stay at Paris is proved by the fact that Troyer accompanied Lord William Bentinck when he returned to Bengal on his appointment as Governor-General.

¹ The enquiries which my friend Colonel Reginald Schomberg, British Consul General at Pondicherry, was kind enough to make at my request both at Pondicherry and at Madras, have failed to trace any record relating to Troyer's marriage.

Sir William Foster's memorandum shows that the list of persons permitted to accompany Lord William Bentinck, the Governor-General designate, to Bengal, as contained in the Court of Directors' despatch to Bengal, dated 28th December, 1827, includes 'Captain Anthony Troyer on the half-pay of the 2nd Ceylon Regiment (an error for 4th Ceylon Regiment) as Aid de Camp'. In the same memorandum Sir William Foster adds the following: "The India List shows him in this post during the whole of Lord William's tenure of the Governor-Generalship. He is not shown as acting in any other capacity, nor can I find him mentioned in the letters from the Government of India to the Court of Directors. I believe, however, that the Calcutta Sanskrit College was not under the direct management of the Government, and it is possible therefore that Troyer may have had some connection with that institution without official notice being taken of it."

Mohl states that Troyer took charge of the 'Brahmanical College' at Calcutta before Lord William Bentinck left India and directed it until his own departure in 1835. Information kindly communicated by the Keeper of the Records of the Government of India shows that Troyer was Secretary to the Government Sanskrit College, Calcutta, up to January 1835. This confirms the statement made by Troyer in the Preface to his translation of the Kashmir Chronicle as to his having held the post of Secretary to that College where certain Pandits were employed for correcting the proofs of Sanskrit texts which were being published at the expense of Government. In the same Preface Troyer mentions having left Bengal in February 1835.¹ Among the various manuscript materials which Troyer is stated to have brought back on his return to Paris as fruit of his scholarly labours at Calcutta, were those he had prepared for his edition of the Sanskrit text of Kalhana's Chronicle of Kashmir and his translation of the same.

We have no exact information as to when Troyer's study of Sanskrit had started. Nor do we know to what extent his interest in India's classical language and its vast literature may have been stimulated by the influence of such great scholars as Horace Hayman Wilson, James Prinsep, Csoma de Körös whom Calcutta could claim at the time of his own stay there. Wilson had been the first to acquaint European students with the general character of Kalhana's Chronicle of Kashmir by publishing in 1825 a critical abstract of its first six cantos. It was James Prinsep, the famous decipherer of Indian inscriptions

¹ Colonel Phillimore points out to me that as Lord William Bentinck's departure on relinquishing charge as Governor-General of India took place on March 25th, 1835, and, perhaps, counted from his embarkation at Madras, it is possible that Troyer accompanied him on the homeward voyage.

and coins, who, if Mohl's statement apparently based on a communication of Troyer can be trusted, made it possible for the first edition of the text, very imperfect as it was, to appear in print at Calcutta in 1835. Either of them might well have drawn Troyer's attention to the importance of the Chronicle.


I have already in my introductory remarks had occasion to point out that Troyer's equipment was inadequate for the difficult task which he had undertaken and to which he devoted himself with such assiduity for many years. A quasi-pathetic proof of this was afforded to me by a letter written by Troyer from Paris on 5th June, 1845, to Professor Horace Hayman Wilson which my friend the late Mr. A. H. Wilson allowed me to see and copy from his grandfather's very valuable store of correspondence. It deals mainly with his labours on the *Kashmir Chronicle*.

Referring to his translation Troyer says that he is 'undergoing a hard struggle with the two languages, Sanskrit and French', and expresses his belief that the two last cantos he was engaged on translating are not the work of Kalhana. In reality this is the most authentic and critically valuable portion of the author's historical record, but rendered often difficult by the lavish display of characteristic rhetorical skill specially appealing to Indian scholars' taste. On reading that letter, written by Troyer in his seventieth year with a remarkably clear strong hand, I felt much impressed with the remarkable perseverance which enabled the aged scholar to complete his 'arduous work', as he calls it, seven years later.

The only other work which was published by Troyer after his final retirement to Europe, was an English translation of the *Dabistan or School of Manners*, a Persian treatise of which David Shea had finished two-fifths and which Troyer completed with notes and an elaborate preliminary discourse. It was published in 1845 on behalf of the Oriental Translation Committee. It deals principally with the religious doctrine patronized by the Emperor Akbar. M. Mohl emphasizes the thoroughness with which manifold problems raised by this curious work are treated in Troyer's introduction but expresses no definite opinion as to the solutions proposed for them.

As Mohl tells us, Troyer continued to pursue his scholarly labours all through the long years of his remaining life spent in Paris, but published none of their fruits. This bears out Mohl's description of Troyer as a man wholly indifferent to fame and content to satisfy his interest in study for its own sake. From the record at Somerset House of Troyer's last will which Colonel Phillimore inspected, it is seen that he died at Royaumont on the 2nd June, 1865, in his ninetieth year, leaving two married daughters and a son (under interdiction). His wife had predeceased him.

We are told by Mohl that the tranquillity of his spirit in old age was such that neither good nor bad fortune could disturb his serene composure. Yet he seems for all that to have retained to the end a bold independence of opinion, which the perfect calm of expression made all the more striking. He is said to have faced undisturbed whatever personal losses and disappointments befell him, heavy as they seem to have been. It is hence pleasant to think that the British half-pay which good health allowed him to draw for fully fifty years, spared him serious material cares. It was a reward well deserved by the services he had rendered in India and by his devotion to India's intellectual interests.



Survivals of the Indus Culture.

By M. E. and D. H. GORDON.

(Communicated by Dr. B. S. Guha.)

The intention of this article is to indicate certain survivals from the Harappa and Jhukar cultures of the Indus Valley over to the Early Historic Period,¹ and at the same time put forward certain objects as deriving from that apparent cultural hiatus of approximately two thousand years.

When one comes to examine the objects from Harappa, Mohenjo-daro, and Chanhudaro in the light of material collected from thirty mounds in the Peshawar, Mardan, Rawalpindi, Lahore, and Montgomery Districts, all demonstrably of the Early Historic Period, certain interesting facts emerge. The small dating value of such objects as shell bangles, knob handled pot-lids, etched carnelian beads, all of which are to be found quite commonly in these sites, impresses itself on one immediately. Nor do these objects show much change: the pot-lids which are made in thousands to-day, are unaltered, shell bangles of both periods show a large range of width and thickness, carnelian beads are etched with very similar patterns, the framed Greek Cross being found at Taxila and Sahri Bahlol. In addition to these objects, Painted Pottery, as such, is found on every one of the thirty mounds mentioned, and is made to-day in all of the five districts in which these mounds are situated.

This does not mean that there is no distinction to be made between the painted pottery of the three periods, pre-historic, early historic, and present day, there are in fact more differences than there is similarity: the similarities with the later types being more readily traceable in the early pottery of Baluchistan and Makran than in the early Indus Valley types. This point requires however a great deal more investigation before any useful theories can be advanced.

Over and above these more common objects, resemblance between which might well occur without having very much significance, there are a number of other articles in which the persistence of type over the great period of time postulated, say about two thousand years, is less easily explicable, and which may possibly be of the greatest importance.

¹ The expression 'Early Historic Period' when used in this article refers to the period from the beginning of the Mauryas to the end of the Guptas, i.e. 322 B.C. to c. 500 A.D.

The first of these is the image of a bird with extended wings on a pedestal. These are common at Harappa where we examined twenty-four of them. Plate 4, fig. 1 shows one of them. Alongside this is shown a similar object, found on the surface at Bala Hissar near Charsadda in the Peshawar District. The concept is identical and also much of the execution. They are both birds with spread wings, ornamented with incised lines to indicate plumage, balanced on pedestals. The particular example from Harappa was found at Mound F only five inches below surface, one similarly incised was found at six feet below surface at the same mound, and yet another at five and a half feet below surface at Mound A-B. Bird figures on pedestals with closed wings are found both at Mohenjo-daro and at Sari Dheri, Charsadda Sub-division. The examples from Sari Dheri and the Bala Hissar date quite definitely from the Early Historic Period.

The familiar bird whistles found at all the Indus Valley sites provide the next example. A fat semi-globular bird again balances on a pedestal, having a whistle hole just above its tail. Plate 4, fig. 3 shows an example from Harappa: alongside it is a bird rattle from Sirkap, Taxila, the shape, pedestal and general style are, allowing for its rather chipped condition, identical. Grouped with the bird whistles of this type at Harappa is one found by Daya Ram Sahni in the early days of exploration there: it has no pedestal and the whistle hole, working on a slightly different principle, is in the head; along the back is a ridge rising like a cock's comb in a series of points. We have an identical one which was made recently by wandering nomads. The Harappa specimen, a surface find, is of course modern and of the same origin, but the clay bird whistle is thereby shown to exist to this day.

The next instance is possibly more peculiar than convincing. At the site of Bala Hissar in particular, a large number of figurines of an archaic type, which can now confidently be dated 200 B.C.-300 A.D., are found cut in half down the centre; in some cases it appears to be quite definite that they were deliberately cut through in this way. We were therefore surprised to find in the Harappa museum a number of figurines both male and female which had been treated in exactly the same way, Plate 5, figs. 1 and 3 show examples from both sites.

The majority of Harappa female figures, those of the Jhukar Period, if they exist, have yet to be identified, have a fan-shaped headdress. Primitive figures from Sahri Bahlol which are almost certainly of Kushan date also have a fan-shaped headdress, and so has a Hellenistic head from Taxila (Plate 4, fig. 5 and Plate 5, fig. 2).

Among the designs on the curious copper tablets from Mohenjo-daro, having a design on one side and an inscription on the other, is an elaborate looped figure. An identical figure

is to be found on a terracotta stamp-die and a terracotta stamped tablet from Taxila (Text-fig. 1). Of a similar style to this

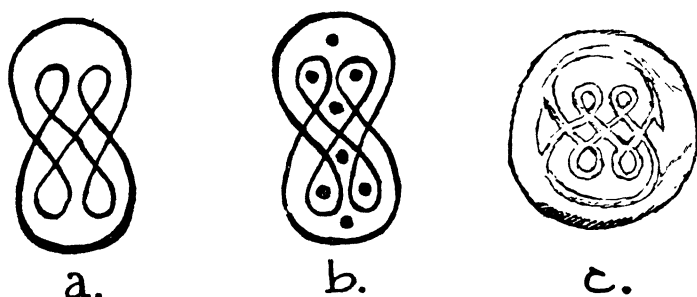


Fig. 1. Continuous looped designs from (a) Mohenjo-daro and (b) and (c) Taxila.

is an intricate pattern on the left of the seal inscription shown in Pl. XXIII, fig. 6, *Arch. Survey of India Report*, 1930-34. A similar design is cut in the floor of the main sanctuary at Kailasa, Elura, and designs of this type are made down to the present day. Regular continuous designs have a wide distribution and a long history, and their diffusion in the Melanesian region, attested by the late Mr. Deacon's work in that area, may be one of the links by which the scripts of Mohenjo-daro and Easter Island hang together.

From Akhkari Dheri, Risalpur, Peshawar District comes a potsherd having on it a peacock, conventionalised, so far as can be seen, in the same way as those on the burial jars at Harappa, particularly as regards the egg-shaped cross-hatched body. Plate 6, fig. 1 shows this sherd with added reconstruction, wings and fan-shaped tail are both clearly indicated in the surviving part, the only conjectural feature being the peacock crest, the fan-shaped tail is however a justification for its possible correctness. From Taxila comes an urn lid from the Mahal area near Sirkap with a design of cross-hatched segments, trees, and peacocks, which definitely associate it with similar lids on burial jars at Harappa. The date of the jar burials at Harappa is at present a matter for conjecture. The style of painting has but the very slightest resemblance to that of the Harappa Period; besides which, as we have observed *in situ*, the Harappa pottery, both plain and painted, accompanies the extended burials.

In the Harappa museum are animal figurines very closely resembling a pig made out of a lemon and four sticks. A figurine exactly of this type, except that it is covered with incised decoration, was found at Sari Dheri. From Chanhui Daro also come small four-legged pottery stands supposed to have been used for cosmetics. These have their exact counterpart

in small four-legged blue schist stands from Buddhist sites all over the Gandhara region. The strange fragments of very thick sectioned pottery with deeply incised patterns found at Mohenjo-daro can also be closely paralleled from these sites.

Finally, Dr. C. L. Fabri, in his article on 'Latest attempts to read the Indus script',¹ discussing the possible use of copper tablets from Mohenjo-daro as coins, suggests a similar use for the seal impressions. These he holds are a forerunner of the punch-marked coins, as 'a form of stamped obligation to pay a sum'. There is much to be said for this idea, but in our opinion there is a more striking survival of this usage than the punch-marked coins. From many mounds in the N.W.F.P., but particularly from Kula Dheri near Charsadda, there come small baked tokens each marked with a seal impression made by the typical intaglio seals of the period 1st Cent. B.C. to 3rd Cent. A.D. We have more than thirty of these, of which quite two-thirds come from Kula Dheri, indicating their existence in very large numbers. These baked clay sealings are, we feel certain, tokens issued by merchants, and therefore had the same function as is assigned by Dr. Fabri to the seal impressions at Harappa and Mohenjo-daro.

Though no very definite conclusions can be arrived at by evidence of this kind, two points stand out very clearly. The first is the rejection by any reasonable mind that these striking similarities are quite fortuitous and in no way related, the Indus types having perished without immediate successors round about 2200 B.C., only miraculously to reappear two thousand years later, from about 200 B.C. onwards. The second is that the interpretation at the Indus Valley sites of the first ten feet of deposit, which, through quarrying, erosion, day to day complication by objects dropped down holes and recovered by earth and misplaced in countless other ways, is so difficult and yet so important, has been a complete failure.

It has been reiterated constantly that there must be links to fill this gap of two thousand years, and it has been urged that digging at such sites as Kosambi and Ramnagar would produce such links.² Mohenjo-daro, Harappa, and Jhukar all have plentiful remains of the Early Historic Period on the surface. It is true for the reasons we have given, that the upper levels of these sites are more difficult to handle than would be the case with the lowest levels of Kosambi or Ramnagar, but it is unfortunate that because of these complications no real effort has been made to reconcile a number of unaccommodating objects with a more acceptable chronology.

¹ *Indian Culture*, Vol. I, No. 1.

² In particular by Sir Leonard Woolley in his report upon Archaeological research in India, where he stresses that further work on the prehistoric sites should be postponed and effort concentrated on bridging this gap.

We must refer yet again to that outstanding article by R. Heine Geldern, 'Archaeological traces of the Vedic Aryans',¹ which is the first really valuable contribution to knowledge on this subject. In linking up Tepe Hissar IIIc, with Transcaucasia and Turang Tepe and establishing a definite date for the adze-axe at Mohenjo-daro, and at the same time its spread via the Caucasus and North Persia, he produces the evidence of animal headed pins and also objects which he terms double animal protomes. Such objects exist at Harappa and Mohenjo-daro.



Fig. 2. Animal Headed Pin from Harappa.

From Mohenjo-daro comes a double headed pin very similar to the type found at Tepe Hissar, dated by Heine Geldern to the IIIc, phase, and from Harappa a pin or rod having a wolf attacking an animal with spiral horns placed on a cross bar. The former was found at the D.K. area at twelve feet below datum and the latter at Harappa one foot below surface and so immediately comes under suspicion (Text-figs. 2 and 3). The style of the Harappa pin is very similar to some from Tepe Hissar and also to a gold Ibex from tomb IV Mycenae which can be dated to the second half of the 16th Cent. B.C. (Bosseret's *Ancient Art of Crete*, fig. 191). At Harappa we found a double animal protome in terracotta almost identical with Heine Geldern's Transcaucasian example; it is in poor condition though quite recognisable by its two heads and curious shape. These few objects may not seem very impressive but they are even less so when suitably kept in the background; they indicate, however, the presence of material which is referable to the middle of the second millenium B.C. at the earliest.



Fig. 3. Double Headed Pin from Mohenjo-daro.²

¹ *Journal of the India Society of Oriental Art*, Vol. IV, No. 2, December 1936. Already quoted by us in our article in *Iraq*, Vol. VII, pt. 1, 1940.

² Figs. 2 and 3. Published by Courtesy of the Archaeological Survey of India.

In addition doubt may reasonably be cast on the dates as now assigned to the following objects:—

- (a) The steatite bearded head with the trefoil robe which has the most striking resemblance to figures of the Sangari and Kadshi, Asiatics on the chariot of Thothmes IV,¹ and is therefore quite possibly not earlier than the first quarter of the second millenium.
- (b) Seal from Chanhudaro, Jhukar Period, showing antelope and flower, is of an Eastern Mediterranean style not earlier than Middle Minoan III, second quarter of the second millenium.
- (c) Seal from Chanhudaro, Jhukar Period, showing ibex, having North Persian affinities similar to the double animal protomes and animal headed pins, dateable to the second or third quarter of the second millenium.
- (d) The shaft-hole hammer-axe from Chanhudaro, not to be dated prior to 1800 B.C.²
- (e) The famous bronze adze-axe with tubular collar, dated by Heine Geldern to 1200–1000 B.C., but in any case not older than the middle of the second millenium.
- (f) The two Harappa statuettes of red limestone and dark grey slate, which cannot by anyone who has held them in their hand and examined them closely, and has a fairly unbiassed mind, be assigned to any date earlier than the 3rd Cent. B.C. at the earliest.
- (g) The terracotta head with moulded bearded face and high pointed cap, found somewhere in the Mohenjodaro D.K. area, which we assign without any hesitation to either the Indo-Parthian or Kushan Periods.³

To these must be added the fact that at Harappa there is a great deal of painted pottery which shows no affinities with that of the 'Harappa Period' but may be of the same period as the burial jars and to which as yet no date can be given, but which must be located somewhere in the two thousand year gap. Painted pots of Jhukar type and pots of Jhangar ware are also non-existent at both Harappa and Mohenjodaro; and though flooding and consequent abandonment of the site at that period may account for the lack at the latter place, it is obvious that

¹ *Vide* fig. 2, page 25, 'The Aryans' by Prof. Gordon Childe.

² For illustrations of (b), (c) and (d) see *Illustrated London News*, November 1936.

³ *Vide* text fig. 2. Mohenjodaro, some observations on Indian Pre-history, *Iraq*, Vol. VII, pt. 1, 1940, by M. E. and D. H. Gordon.

these terms have only very local application as they are also inapplicable to the pottery of Makran or the Zhob.

The sum total of these trifles is not to be ignored, if indeed they are as trifling as some appear to consider. In any case objects have been shown to exist which indicate that there are a number of definite survivals from the pre-historic to the early historic period. The important point which follows unquestionably from this basic fact is that if they are survivals they must be connected. Objects have also been shown to exist which in our opinion indicate quite clearly that the apparent blank hiatus is only the result of inadequate research. 1

Up to date the chronological yardstick of the Early Historic Period has been the successive types of stone statuary, their treatment and their ornament, about which there can be but small differences of opinion, such as whether the large early Yakshas are really Mauryan or post-Mauryan, and whether the Buddha image of Gandhara is older than that of Muttra. The measure for the pre-historic period is derived solely from links with the early chronology of Iraq. At any rate both these periods have a basis of fact for any chronological arguments advanced; this is not so in the case of the hiatus. Here we find that the measure is the period of time which various pundits and philologists consider must have elapsed for the production of certain scriptures and the development of certain religious ideas. Added to which are some notable speculations, such as whether the pole star was sufficiently in evidence at some not very well fixed period, for it to be taken as an image of constancy. All such fantasies, including the arrival of the Vedic Aryans from the North Pole about 30000 B.C. and their existence in another Yuga when the Universe presented a different aspect, are profitless conjecture. The truth is that so far as India is concerned we have no measure for this period and but very few facts on which to form one.

The Indo-European names found in the archives of Boghaz Keui and 18th Dynasty Egypt have only the vaguest value in determining the period and progress of the Aryan occupation of Northern India; for Vedic India is by tradition Northern India, and it is there that search must be made to fill the gap in our knowledge. So far nothing has been done which has yielded very concrete results, a summary of this material, real or hypothetical as has yet to be determined, may prove to be of some interest. Firstly, there are the few objects which we have mentioned above as being almost certainly of middle second millenium date, found for the greater part in the upper levels of pre-historic sites, those first eight or ten ambiguous feet. To these may be added the copper and bronze objects put forward by Heine Geldern in his article, namely the Truncheon Axe from the Kurram, the Punjab Dagger, the Bithur Dagger and Harpoon head, the Fathegarh Swords and the Rajpur Harpoon,

all of which together with the Mohenjo-daro Adze-axe he refers to the period 1200-1000 B.C. Besides these there are only the ancient walls of Rajagriha, the 'Vedic' burials of Lauriya Nandangarh, the punch-marked coins, the various terracottas which from time to time have been loosely classified as Primitive and Pre-Mauryan, a good deal of painted pottery about which so far but little is known, and the somewhat meagre knowledge we possess of the ancient sites of the Punjab and the N.W.F.P.

For the Walls of Rajagriha and the Nandangarh burials a date of 800 to 700 B.C. is claimed, which may prove to be correct in the case of the former, but the mounds of Lauriya Nandangarh have been examined by Mr. N. G. Majumdar; four of them were cleared of earth until the underlying structures were revealed, these proved to be Buddhist stupas possibly of early date. The gold leaf female figure, thought by Bloch to be an Earth Goddess, came from a trench on the top of this recent work and is therefore not of Vedic date and probably Post-Mauryan. I have purposely omitted any reference to the Megaliths and Cairn burials of Southern India and Hyderabad, as I consider that the North is the region where links must be found if they are to carry conviction. The Megalithic remains of the North, Burj Hama in Kashmir (*Antiquity*, June 1937) and Asota in the N.W.F.P. (*Antiquity*, December 1939), afford but little help. The former is extremely 'sui generis' both as regards the monument itself and the remains which have been excavated there. The latter may well be of no very great antiquity and at the moment there is nothing available to support a contention either way.

Punch-marked coins we feel need to be handled with caution. It is undeniable that many if not the majority of the symbols on them have their counterparts in the Indus Valley script. These symbols are therefore almost certainly survivals, but after what lapse of time, that is the question. Here we need to go warily, for in quite early literature these coins are known as 'purana' and that is quite sufficient for many Indian archaeologists to date them back indefinitely. To us it is plain however that the term purana (ancient) is of exactly the same value as when the present day owner of a battered Moghul copper coin tells you that it is a Sita-Rami, nine hundred lakhs of years old, which merely means that in his opinion it is very ancient; that is to say, as proof of any particular dating the term 'purana' has no value at all. A very clear exposition of the evidential value of the punch-marked coins and their symbols is given by Dr. C. L. Fabri in his article 'A new branch of knowledge in India'.¹

The question of the Pre-Mauryan terracottas is still being worried out. So far not one single terracotta from any level of any site of the Early Historic Period can be shown con-

¹ *Indian Culture*, Vol. III, No. 1.

clusively, even by the unreliable method of archaeological dead-reckoning, let alone association with definitely dateable objects, to be of Pre-Mauryan date. As for the criterion of style, unless backed by conclusive parallels with material of known and accepted date, considerable familiarity with many hundreds of Early Indian terracottas makes us regard this method as on the whole worse than useless. The primitive and the archaic can again and again be shown quite conclusively to be the result of ineptitude and degeneration. Hellenistic Indo-Greek may turn out to be Hellenistic Indo-Roman of the early Imperial period when Greek art was 'the thing'. There are in fact a multitude of unappreciated pitfalls.

Of all the archaic terracottas those found in the Gandhara-Taxila area with applied and incised eyes are the most intriguing. They can now be shown as coming from fourteen sites in British India as well as others in Afghanistan and Tribal Territory. I cannot with propriety at this stage say more than that excavation at Sari Dheri¹ revealed such figures throughout the section from two feet to thirty-five below datum in the main mound, and at 40½ below datum and 9½ below surface at an adjacent point originally covered by the mound. As a Hellenistic moulded torso was found in the main mound at 37½ feet and a Menander coin at 32 feet² below datum, it is unlikely that anything found is older than 200 B.C. This, of course, does not rule out the possibility of finding them with yet earlier associations.

There is one point, however, that needs clearing up once and for all, and that is the possibility of these figures being in direct succession to those of Harappa and Mohenjo-daro. In point of fact, though it would be most helpful and convenient to believe otherwise, the figures under discussion have no real resemblance to those of the Indus Valley sites. In particular we wish to pin down this matter of applied and incised eyes. Though Mlle. Corbiau states, and we are sure and assured states quite accurately, in *Iraq*, Vol. IV, Spring 1937, that 'Dr. Mackay tells me that among the unpublished material of Mohenjo-daro this feature is quite frequent', the facts are however as follows:

At Mohenjo-daro out of 516 human figures examined by us not one had applied and incised eyes. The example quoted by Mlle. Corbiau was noted and is a bearded head broken almost certainly from a man-headed animal. Of the man-headed animals, out of 61, four have applied and incised eyes, and one applied and indented. At Harappa out of 673 human figures

¹ Excavation was carried out at Sari Dheri during May, and October to December, 1938, by Mille, Simone Corbiau and Mr. Mukerji of the Archaeological Department. The results have yet to be published.

² As Kushan copper coins were found down to this depth the Menander is we feel a survival in a higher level than its true context, and it is probable that some of the square copper coins unearthed between 32' and 42' B.D.L. will be found to be Saka issues.

examined one had applied and incised eyes, and of the 13 man-headed animals, two only had this feature. This disposes finally and definitely of this convention being a survival characteristic of the pre-historic period.

Another point may also be touched on in passing, and that is that there is one figure only from both Harappa and Mohenjo-daro which has the smallest resemblance to the pre-historic female figures found at Periano-Ghundai and other sites in the Zhob. The latter are of fragile creamy white clay, and the ornaments, eye forms, headdress and general style of modelling are all totally dissimilar from the Indus specimens. The same lack of similarity being found in the painted pottery types, this material should be used with the greatest caution when looking either for the origins or offshoots of the Indus Cultures, both in time and space.

It would be rash to deny that none of the terracottas found at sites other than those containing remains of the Harappa Period is of Pre-Mauryan date, but none of them is demonstrably so. The Archaic types from the Frontier Province and Taxila and those from Muttra cannot be dated higher than 250 B.C. and it is unlikely that any of them are earlier than 200 B.C. The terracottas from Kosambi fall in line with those from Muttra, and the earliest types from Bhita and Basarh may possibly be Mauryan but are certainly not Pre-Mauryan. The material from Buxar has been treated in such a way that it is quite impossible to make head or tail of anything connected with this site.¹ The female figures with moulded faces appear to be Sunga and the primitive type with directly incised diamond-shaped eyes and small pursed-up mouth can be paralleled from Taxila. The alleged Pre-historic and Sumerian connections will need to be supported by the results of scientific examination before they can receive any serious consideration.

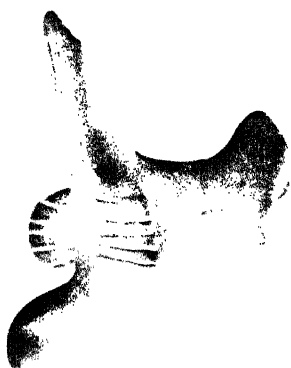
Surface investigation of sites is, to say the least of it, inconclusive. At the same time certain observations made in this way may be of some small value. The bluffs above the Soan River in the vicinity of the Attock Oil Company's Works are an example and a warning; here on the surface may be found any number of quartzite artifacts, a very few chert microliths, pottery of the Buddhist Period, and painted pottery, some of which may be as early as the 1st or 2nd Cent. A.D., but most of which is almost certainly modern. A site near Taxila produced one very finely struck micro-core of chert; wide and careful search failed to produce further traces of this material. The site yields plenty of painted pottery, all of it

¹ Remains of a Pre-historic Civilisation in the Gangetic Valley by Dr. A. Banerji-Sastri in the K. B. Pathan Commemoration Volume. The references in the text have no relation to the numbers on the very indifferent plates. The text is modelled very closely to that of A. K. Coomarswamy's article in *Ipek*, 1927.

dated to the early centuries A.D. if not later. The Akbar mound near Gugera, Montgomery District, about thirty miles from Harappa, though a vast mound with deep eroded channels in it, does not show a single sherd of Harappa type, though there is plenty of pottery, including painted pottery, of Buddhist, Mediaeval, and Mohamedan times. At Harappa however unmistakeable 'Harappa' types are in profusion both on and close to the surface. At first sight this does not appear to get us anywhere, but it does lead us to one important point. Painted pottery in India, without critical knowledge of patterns, shapes, colours, slips and texture, is quite meaningless, and even the presence of an odd chert flake does not make a pre-historic culture. We were under the impression that the word chalcolithic indicated the co-existence of stone and bronze implements, yet sites have been called chalcolithic simply on the strength of some painted pottery almost certainly of the historic period and not necessarily the early historic period at that.

Enough we hope has now been said to show that a blank hiatus of two thousand years in Indian culture does not exist, and at the same time give some tentative indication of the links available, and the pitfalls that await the investigator over this line of country. It is to be feared that it will be possible to add but little to this until there has been more and better digging.

1 Figs. 1 & 2. Pedestal Type Birds, (1) From Harappa (2) From Bala Hisar.



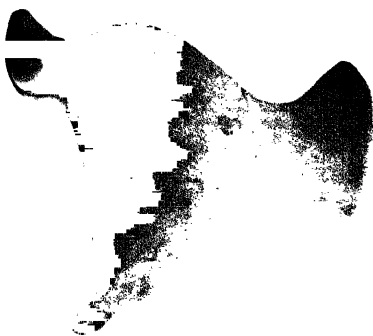
2



5

Fig. 3. Bird whistle from Harappa.
 " 4. Bird rattle from Taxila.
 " 5. Hellenistic Head with fan-shaped headress, Taxila.

(Figs. 4 & 5 published by the courtesy of the Archaeological Survey of India.)



3



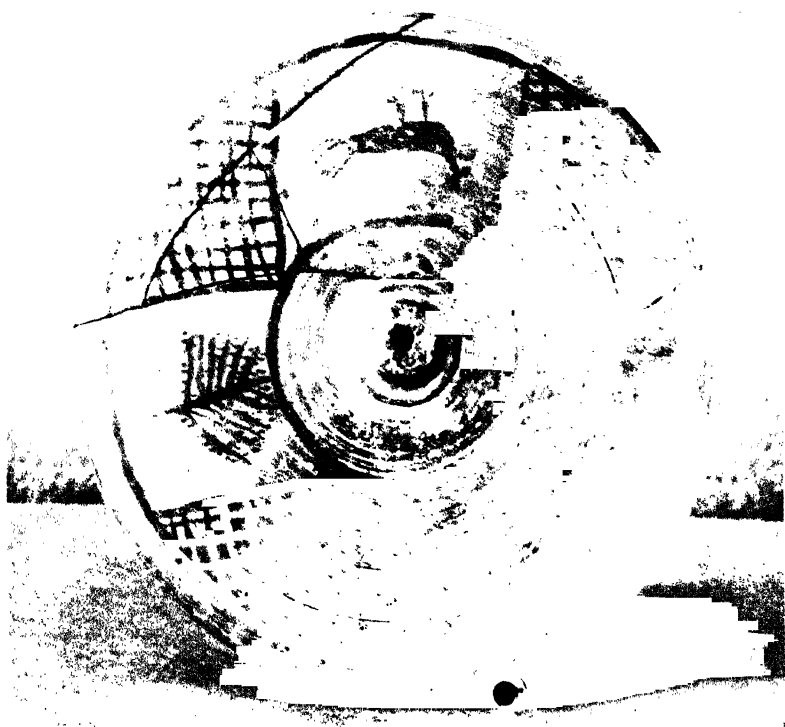
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FIG. 1 Potsherd with peacock design, Akhkari Dheri, Risalpur.



**Some Observations on Two Copper-plate Grants from
Bhāṭerā, Sylhet District, Assam.**

By UMESH CHANDRA CHAUDHURI.*

(Communicated by Mr. J. C. De.)

About the Bengali year 1279 (1872-73 A.D.), two copper-plate inscriptions were found on a hillock in a village known at present by the name of Bhāṭerā in the District of Sylhet, Assam. This village lies at the eastern foot of a small hill, extending north and south from Maurāpur on the southern bank of the Kuśiārā river to the northern bank of the Manu, and spreading over an area of about twenty miles in length and between three and five miles in breadth, interspersed with several small hills about fifty to two hundred feet high, all covered with dense jungle.

Along the eastern side of the hill (known in the records of the Forest Department as the Bhāṭerā Hills) and just by the side of the Sylhet-Kulaurā branch line of the Assam-Bengal Railway, between the mile-posts $2\frac{1}{5}$ and $2\frac{1}{9}$ lies what was to all intents and purposes a deserted hill-fort, with brick-built stairs to reach the level of the fort. At the present moment however there remains little of what must once have been a magnificent structure.

In the Bengali year of 1279 (1872-73 A.D.), a local zemindar, the late Babu Kāśī Chandra Chaudhuri arranged to collect old bricks from the above-mentioned fort for some constructional works in his house. One of his men employed on the task, came across the two copper-plates, placed one above the other, in course of digging. Some five or six years later, after the death of Kāśī Chandra, the plates passed into the hands of his youngest brother, Babu Jagat Chandra Chaudhuri. Facsimile impressions of them were sent to Dr. Rajendra Lala Mitra, the then Secretary of the Asiatic Society of Bengal. The inscriptions were transcribed by Panditā Ramā Bāi and her brother Śrīnivāsa Śāstri and the whole was published by Dr. R. L. Mitra with a short note, English translation and facsimiles in the *Proceedings of the Asiatic Society of Bengal* for August 1880.

The plates are now preserved in the Archaeological Section of the Indian Museum, Calcutta.

* The author expresses his gratitude to Mr. R. K. Ghoshal for kindly revising the paper.

As has been said already, it was Dr. R. L. Mitra who published a comparatively full and critical edition of the two grants. These were next discussed by scholars like the late lamented Pandit Padmanath Bhattacharya and Dr. K. M. Gupta in the periodical press of Sylhet and Calcutta. Dr. Gupta further re-edited one of the plates (that of Keśavadeva) in the *Epigraphia Indica*¹.

In the present paper I have endeavoured to discuss the two records afresh in the light of such local and topographical knowledge as I have been able to collect by a long and continued residence in the District of Sylhet very near to the find-spot of the inscriptions concerned.

Locality.—As we have stated above, the plates were discovered from the ruins of a fort on a hillock or *ṭilā*. The hillock is about 150 feet high, the highest level portion measuring about 400 feet from east to west and about 200 feet broad from north to south.

The eastern side of the hillock has even now distinct traces of extensive long and broad stairs made of bricks. These stairs, commencing from the upper portion of the hill-fort, go down to the bank of a tank which is about 600 feet long and 300 feet broad. The tank at present goes by the name of Sātpāḍi Pukur (i.e. 'tank with seven banks'), whatever that may imply. The Sylhet-Kulaurā branch line of the Assam-Bengal Railway runs by the western bank of this tank separating it from the stairs-system of the hill-fort referred to already. There are traces of another old tank a little to the north-west of the hill-fort which now passes under the name of Baḍa Pukur ('the big tank') and which is about four times larger than the Sātpāḍi Pukur.

The southern and western sides of the hillock permit an easy access, but the northern side is steep and difficult to negotiate. Considering the enormous extent of the ruins on the hill, it may well have represented the royal palace of the kings of the Bhāṭṭapāṭaka line.

Towards the north of the palace or hill-fort, within half a mile, there is a smaller hillock which goes by the name of *Homer ṭilā* (i.e. the mound for the performance of *Homa* rites). At the foot of this *ṭilā*, there is a tank about 150 feet long and 90 feet broad. The *Homer ṭilā* is about 50 feet in height and approximately 100 feet in length and breadth, though not exactly squarish in shape. At the central part of the upper portion of the hillock, there was the sacrificial pit (*Homa kunda*) built of the same type of old red bricks. The pit itself was $3\frac{1}{2}$ cubits in length, breadth and depth.

About two or three furlongs to the north of the *Homer ṭilā* we come to what are called the Darbārī *gul* and the Darbārī

¹ Vol. XIX, pp. 279 ff.

tilā. The latter stands in the centre of a plain. It is about 20 feet high, 90 feet long and 60 feet broad. Here the royal personages of Bhātṭapāṭaka would seem to sit with their officers in a position overlooking the multitude that would gather over the extensive plain. The very appearance of it points to the probability of its having been a very suitable place for holding royal *darbars*. By the north and south of this plain run two small streamlets: The one by the north side has dried up long since, but the southern stream which now bears the name of Phulchhadā is still active.

About a mile off, to the east of the Darbārī *tilā*, are the Dakṣiṇā *Kāndī* and the Dakṣiṇā *bil* to the east of which is the great Hākāluki *haor*. It was perhaps at this spot that King Keśavadeva performed the Tulāpuruṣa *yajña* referred to in the smaller inscription and distributed *dakṣiṇā*.

The plates and their purport.—Both the grants are records of gifts of land, houses, slaves, etc., to two household deities, probably of the royal family. The earlier and larger of the plates records a gift of 375 *hālas* of land, in 67 plots and 51 villages, scattered over the sub-divisions of North and South Sylhet, Habiganj and Karimganj and also partly in the plains of the Cachar District. Along with this land 296 houses and a number of slaves were given away in the name of Vateśvara Śiva by king Keśavadeva. Vateśvara Śiva has been mentioned as 'the Lord of Śrīhaṭṭa' (*Śrīhaṭṭa-nātha*) in whose honour Keśavadeva built and dedicated a number of temples.

The latter and smaller plate is a gift of two *hālas* of land to Kamalākānta Nārāyaṇa by King Īśānadeva, son of Keśavadeva, the donor of the earlier grant. Dwelling houses and fields included within the area were also given away to the deity and a lofty temple was built for Nārāyaṇa or Viṣṇu.

As regards the dates of the inscriptions a number of suggestions have been offered. The date on the earlier plate begins with *Pāṇḍava-kulapāl-ābda* followed by four numerals. Paṇḍitā Ramā Bāi and her brother Śrīnivāsa Śāstri read them as 2928, while according to Dr. R. L. Mitra it stood for 4328 corresponding to 1245 A.D. The latest reading is that of Dr. K. M. Gupta who puts the date at 1049 A.D.

We may now proceed to an examination of some of the interesting facts elicited by the records under discussion. For purposes of convenience, we have preferred to deal with the several points at issue under the following heads:

(i) *Alleged connection of the Bhāṭerā group of kings with those of Cachar and Āgartālā.*—There has been some inexplicable unanimity of views among some of our scholars on this particular point¹. The Bhātṭapāṭaka kings have long been

¹ See e.g., *Proc. A.S.B.*, August, 1880, p. 144; *Ep. Ind.*, vol. XIX, pp. 280 ff.

regarded as sovereigns of Cachar, the founder of whose dynasty is traditionally supposed to have been Ghototkaca, son of Pāṇḍava Bhīma by Hidimbā, daughter of an aboriginal chief. As a matter of fact however, the available data point to a quite different conclusion: The people who now go by the name of Cacharis were originally settled in the Brahmaputra valley. Driven by the rising Ahom rulers, they betook themselves to Dimapur about 1531 A.D. Being still hard pressed by the Ahoms, they moved on to Maibong and thence finally to the vast plain of Cachar where they established their new home. They were essentially a community of uncultured hill-people having absolutely no alphabet whatever and as yet entirely uninfluenced by Sanskrit culture. It was in fact not till after the 16th century of the Christian era that the people of Cachar were converted into Hinduism and it was about this period that the legend of a Pāṇḍava extraction of their kings was concocted to keep up their pride.

It will thus appear that the dynasty of the kings of Bhaṭṭa-pāṭaka and those of Cachar were far too separated from each other in point of time—by three or four centuries to be sure—to allow us to accommodate any theory as to their being mutually related.

As regards the Āgartalā kings, it is well-known that their dynasty originated from the Shān States of Northern Burma and their family title was originally the inconspicuous *Phāñ*. They entered Assam for the first time in 1228 A.D. It was about the first quarter of the 14th century, that some branch of them crossed the North Cachar Hills and passing the Lushāi and the Chittagong Hills, settled itself at Āgartalā¹. This branch was converted to Hinduism in the 16th century, i.e. about the same time as that of the kings of Cachar. They now changed their original family title of *Phāñ* into *Mānikya* which is current to this day. It seems therefore unlikely that the kings of the Bhāṭerā plates² had any family link either with those of Cachar or of Āgartalā.

What however looks more reasonable is to surmise that the kings mentioned in the Bhāṭerā inscriptions were a group of chiefs who wielded some influence in the country representing the modern district of Sylhet. This dynasty continued apparently for five generations after which it became extinct. Possibly it was only a result of the oncoming Muhammadan invasion of the country. Or it may have been that the last

¹ For the origin of the Cachar and Āgartalā kings, see E.A. Gait, *History of Assam*, pp. 242-43 ff.

² From the nomenclature of the family titles and the names of the persons, as well as most of the place-names mentioned in both the copper-plates, it appears that the land was a part of Bengal and the persons were Bengalees.

member of the line—Īśānadeva—died without leaving an issue and the dynasty came to a natural end ¹.

(ii) *Tradition of alleged association of the Iṭer ṭilā and the Homer ṭilā with king Gauragovinda.*—The whole question appears to us to hinge on a mistaken identification and also perhaps an unwarranted word-interpretation. In the earlier of the Bhāterā plates (that of Keśavadeva), the donor king is described (ll. 9-10) as *ripurāja-śoṣī-Govinda-ity=ajani Keśavadeva eṣaḥ* ², which has been almost unanimously taken as pointing to there having been a second name, *Govinda*, of king Keśavadeva ³. If one may hazard an opinion on this point, the explanations of this epithet offered so far seem to be quite strained. In fact the whole phrase could conveniently be broken up into two distinct but inter-related parts: (i) *ripurāja-śoṣī-Govinda-ity=* and (ii) *ajani Keśavadeva eṣaḥ*,—meaning that king Keśavadeva is here regarded as having been the equal in might of Govinda (Lord Kṛṣṇa), the destroyer of enemies. Such expressions, as will be readily admitted, represent but a common epigraphic and literary convention of the age to which our record belongs.

It has further been assumed ⁴ that the ruined mound called Homer ṭilā marks the spot where king Gauragovinda (*alias* Govindasimha) used to perform sacrificial rites. This assumption is of course a corollary to the supposition that Govinda is only another name of Keśavadeva. The explanation suggested by us, if accepted, will surely help to dispel such a notion. It should also be taken notice of that Gauragovinda of North Sylhet was conquered by Shah Jallal in 1384 A.D.

¹ It appears however from the later inscription (No. II, *Proc. A.S.B.*, August 1880, p. 153, ll. 25-28) that Īśānadeva had a childless elder brother (*sthavirah putraśūnyah*, l. 27) and that he had another brother who pre-deceased him leaving a widow and a son. No record has yet been discovered of this fatherless child. Perhaps even before he grew up to manhood the whole country was engulfed by the Muhammadan invasion.

² In the inscription of his son Īśānadeva, Keśavadeva is referred to (ll. 8-9) in almost identical terms, *viz.*, *ripurājā-śoṣī Govinda-rōro . . . etc.*

³ *Proc. A.S.B.*, August 1880, pp. 144, 151n; *Ep. Ind.*, vol. XIX, pp. 279 ff.

⁴ *Proc. A.S.B.*, August 1880, p. 144.

The Ancient Workers of Western Dhalbhum.

By E. F. O. MURRAY.

(Communicated by Dr. B. S. Guha.)

The Dhalbhum pergannah, which forms the most easternly portion of the Singhbhum district of Chota Nagpur, has long been noted for the multiplicity of ancient workings that occur therein. It has an area of nearly 1,200 square miles through which the copper belt runs roughly south-east to north-west for a distance of over 50 miles, quite half of which must be covered by old workings when parallel lines are taken into consideration. In addition to the copper workings the ancients have worked gold, both alluvial and quartz, in the southern and eastern portions, and soapstone, while numerous small heaps of iron slag are to be found scattered all over the pergannah wherever the ore occurs; the refuse of the local iron smelters, which industry still exists in the remoter parts up to the present day.

On its eastern border is the Midnapore district and the States of Mayurbhanj and Seraikela bound it on the southern and northern borders, while in the centre comparatively level or undulating country predominates, divided by the range of hills that follows the copper belt over the greater portion of the pergannah. The inhabitants of Dhalbhum consist mainly of Santals, Mundas and Bhumij with a sprinkling of Hos and Kherrias, all members of the group that must have been in possession of the greater part of Northern India in pre-Aryan days. Among the semi-Hinduized castes may be mentioned the Goālās (cowherds), the Kumhārs (potters), the Kammārs (blacksmiths), the Perehs or Tāntis (weavers) and the Mahles (basket-makers), the last four being essential to the existence of village communities. The Santals, Mundas and Hos all speak languages belonging to the Mon-Khmer group of the Austric languages of which Pater Schmidt found relics among the forest tribes of Pegu, Malacca and Indo-China, and along the middle Salwin, the Nicobars, and part of the Philippines and Oceania.

Ethnologically the Santals, Mundas and Kols all belong to the Proto-Australoid family which is widely distributed in Southern Asia and the Oceanian islands. Risley in his measurements of the various tribes obtained the following indices:

		Cephalic Index	Nasal Index	Stature
Munda (100)	..	74·5	89·9	1446
Santal (100)	..	74·5	88·8	1510
Kol (32)	..	72·4	82·2	1650

The specimens of the last, however, are stated by him to have eastern Hindi as their tongue, to live in the United Provinces, and to be of Aryo-Dravidian type. This cannot be taken as typical of the Kols of the Kolhan of Singhbhum whose language is allied to Mundari and Santali and with whom they have similar physical characteristics. Both the Mundas and Santals have legends about migrations from the west before the Aryan invaders, in times when Indian history was confined to legends; and in the *R̥g-Veda* frequent mention is made of the *Dasyus* or *Savaras*, the Aryan names for the original inhabitants of the country. Both Kolarian and Aryan traditions point to these tribes as having extended further to the north-west prior to the invasion and to having been gradually driven into the more southern and eastern hills as the Aryan invaders fought their way towards and down the Gangetic plain.

Roy¹ has traced the wanderings of the Mundas by their traditions and pointed out that many of the names of the enemies of the Aryans, mentioned in the *R̥g-Veda*, are to be found among the Mundas and allied tribes at the present day,—evidence that the writer is able to corroborate from further examples. That the aboriginal races were not mere savages is evident from the accounts of their organization, strong-built cities and forts which gave much trouble, while their wealth proved a source of envy to the invaders. From *Āzamgarh*, now in the United Provinces, Munda tradition commences, so it would appear that they must have remained for some time in this district, an assumption that is supported by Hindu tradition. By the reign of *Rāma Chandra* of *Ayodhya* the *Raj-Bhars* appear to have been the only tribe left at *Āzamgarh* and before the departure of the *Savaras*, or *Asuras* as they were then called, both Hindu and Munda traditions record a deluge. Gradually they continued their eastward march before the increasing hordes through *Bihar* into *Chota Nagpur*, but from their later temporary sojourn in *Rohilkhand* and further west the invaders would appear to have met with some reverses and the native races to have regained some of their terrain. This change of tide in their fortunes would seem to be confirmed by sepulchral cairns existing near *Nagar*, and attributed to the aborigines, representing two distinct stages of culture. In the first only stone implements and rough pottery are to be found, while the latter contains iron weapons and gold and copper ornaments.

The earliest foreign reference to the use of iron in India appears to be the description in *Herodotus*² of the Indian mercenaries in *Xerxes*' army in 480 B.C. who were clad in cotton garments and armed with bamboo bows and cane arrows with

¹ Roy, S. C.—*The Mundas and their Country*, Chap. I, 1912.

² *Herodotus*, VII, 65.

iron tips, which with the addition of axes form the complete armament of the aboriginals in modern times.

The Hos, or Kols, appear to have occupied Chota Nagpur from pre-historic times though they are reputed to have at one period ousted the Bhuiyas from Singhbhum and to have settled there, where the majority of them now are. Their prowess in the field earned them their name of Lerrka (fighter), by which they are known to the other tribes at the present day, and in their encounters with the British fully sustained their reputation until they realized that axes, bows and arrows could not seriously compete with firearms and cavalry.

Pliny in *Hist. Nat.*, quoting from Megasthenes, states that 'The tribes which dwell by the Ganges are the Calingae nearest the sea and higher up the Mander; also the Malli among whom is Mount Mallus, the boundary of all that region being the Ganges'. Mount Mallus is probably identical with Mount Mandar of the Vedas which lies near Bhagalpur and the Malli with the Mahle Paharias who occupy the Rajmahal Hills. The Calingae were the inhabitants of the kingdom of Kalinga, or Orissa, which, with lapses, preserved its independence from the earliest times until towards the end of the eleventh century A.D. when Kulottunga I added it to his dominions. That the Kolarian tribes were in this region in the sixth century B.C. is proved by records of the travels of Vardhamāna Mahāvira who was the twenty-fourth Tirthankara and main founder of the Jain religion in which it is stated that 'he traversed the country occupied by the Bajra Bhūmi and Sudhi Bhūmi (the modern Bhumij) who abused and beat him and shot at him with arrows and barked at him with dogs, of which small annoyance he took no notice'.

As a detailed account of the geology of the district does not come within the scope of this paper this subject will be dealt with as briefly as possible. Singhbhum is composed mainly of Archaean rocks. In Dhalbhum the Dharwar complex is represented by lava flows in various stages of metamorphism, phyllites, slates, talc, hornblende and micaceous schists and quartzites. This period was followed by intrusions of granitic batholiths, which in their turn were invaded by doleritic dykes of varying basicity, whose extent is generally limited by the perimeters of the acid intrusives. The Dharwars are the main seat of the Indian metalliferous ores, most of the gold, copper, iron and manganese produced in the country being connected with them. Copper, having been the cause of by far the greatest proportion of the ancient and more modern workings, this will be dealt with first.

The Singhbhum copper belt, which starts from 5 miles north of Chakradharpur in the west and runs through the States of Kharsawan and Seraikela, enters Dhalbhum between the villages of Keryuadungri and Rangadih where old and

more recent workings show three more or less parallel runs of ore. Further east between Talsa and Nandup and on Chandar Buru these veins have been extensively mined by the ancients, and in more modern times by the Singhbhum and Hindustan Copper Companies, of whose activities Stoehr, Durrschmidt and Schenck have left records.¹ On Chandar Buru old workings are very numerous on three lines of ore: while extensive old workings occur between Talsa and Turamdih on the southern line; on the centre and southern lines near Sideswar, to be described later, and others further east beyond the limit of this article at Surdah and Mosaboni. • It is on the last of these that the Indian Copper Corporation has developed its Mosaboni Mine.

On Chandar the ancients were well clear of the water-line as the summit of the hill is about 700 ft. above the surrounding country and most of the ore occurs near the top. Old ventilation shafts are to be found on both the northern and centre lines, the latter being circular and about 3 ft. in diameter by 20 ft. deep to the debris in the bottom above the stope level, while the dumps from all three runs of workings are considerable. From the numbers of palaeoliths, bouchers and neolithic cores, flakes and beads occurring in the neighbourhood, this would appear to have been one of the earliest points of attack of the ancient miners, and the wreckage of trap implements in the dumps leaves no doubt about the extraction of copper having been started with their aid. As plenty of iron ore exists close at hand one can only assume that the use of this metal was not then general. Between Chandar Buru and Hartopa there are no prominent hills along the line of belt and old workings are confined to sundry ridges that rise out of the plain, but from the latter to Rajdoha they are fairly extensive on both sides of the Garrha River which cuts across the strike at right angles. From Rajdoha, where three inclined and one circular vertical shafts have been sunk and one adit driven in modern times, old workings are scarce until close to the Kapurgadi Pass where considerable runs occur on the hills on both sides. The easternly run of these is continued to Rakha Hill and was included in the area worked by the Rajdoha Mining Company towards the end of last century. On Rakha Hill old workings are numerous and can be followed until they run up on to the spurs that connect the northern side of Sideswar with the lower country. Here as at Nandup and Chandar three parallel runs are found: the most northernly follows the crest of the spur south-east of Roam; the centre, which is the most important, the flank of the next ridge to the south, while the third is below Sideswar itself. This last consists of an open stope running from the valley into the side of the hill and connected some way in by a steeply inclined circular shaft

¹ Gold, Copper and Lead in Chota Nagpur, W. King and T. A. Pope.

of about 4 ft. in diameter to the ground above. The top of the ore shoot being flat this was soon below the surface of the rising ground and the shaft must have been sunk for ventilation, though the steps cut in it permitted its use as an emergency exit. The northern line was explored by an adit started from the valley by the Cape Copper Company, which had taken over the assets of the Rajdoha Mining Company in 1912, but on holing into a very extensive ancient stope and meeting with runs of filling or fallen rock, both above and below the adit level, suspended this work. The height of this stope was probably little short of 150 ft. and of undetermined length, but the only things of interest produced were some small baked clay pots that had probably been used as lamps by the miners.

The only important source of gold hitherto discovered has been in the south-western portion of the pergunnah close to the Mayurbhanj border. Here numerous trap grinding and crushing stones litter the jungle south of the village of Kundrukocha, with further small clusters over the hills in Mayurbhanj State. Isolated ones are to be found in most of the localities where blue or white quartz veins are available, proving that the ancients must have scoured the district in search of payable deposits. Numerous old workings have been found in various places around Kundrukocha and in 1913 the Dhalbhum Gold and Minerals Prospecting Company was floated in Calcutta to work this area. Its activities have already been described¹ so it is only necessary here to state that during the years 1916-1920 gold to the value of £25,000 was obtained, nearly all of which came from the Porojarna section. Most of the ancient workings follow pipe-like enrichments on folds, but in one case values of 2 ozs. over 30 ins. were obtained over a length of 80 ft. from quartz that did not outcrop and was thus missed by the old miners. The greatest depth so far known to have been reached by the ancients here is 97 ft. on a pipe coming down from the top of Porojarna Hill, and in the bottom of this were found a stone hand hammer and broken chisel.

Soapstone resulting from the metamorphism of trap is to be found in many places all over the pergunnah, though by far the largest aggregate of workings exists on the hill to the west of Bhitari Dadi village, which rises to approximately 700 ft. above the plain. The rock varies in colour from light grey to bluish grey and is often traversed by streaks or stringers of magnesite, which spoil such parts for utensils without occurring in sufficient quantity to make their extraction an economic proposition. A large portion of the southern flank of the hill is covered by the spoil from the workings near the crest on that side, many of which are being exploited at the present day to meet the

¹ Gold in Chota Nagpur, E. F. O. Murray, *Min. Mag.*, Vol. XXVIII, No. 1, 1923.

demand for soapstone bowls and plates, and as this may be of interest, a description of the operations will be given.

The miner, having selected what he considers a suitable band of rock in one of the open-cast workings attacks this with an implement of local manufacture that is a cross between a pick and a hammer until he has cut a circular groove somewhat larger than the size of the article desired, that slopes from the inner side and is vertical on the outside. When he is satisfied that the groove is deep enough the next step is the removal of the piece from the rock, which is accomplished by the use of hammer and chisels. This is the most hazardous part of the process as owing to the uncertain fracture of the rock many pieces break otherwise than intended. Having overcome this stage he next gives the piece a rough dressing outside the working, after which it is put aside and mining continued. At the close of this the miner with the aid of his wife removes the roughly dressed blocks to the village where they are to be turned, to effect which a lathe of some sort is obviously necessary. In the ground are sunk two slats of wood with semicircular notches to take a wooden roller about $2\frac{1}{2}$ ft. long, to one end of which the plate is stuck by means of lac, two grooves on the roller running in the notches preventing lateral movement. The motive power is supplied by the wife who takes some turns round the roller with a piece of thin rope and holding an end in either hand imparts the necessary motion while the man with his cutter, a piece of iron or steel let into the end of a stick, removes the superfluous portions. The northern side of the hill is the one that was mainly worked by the ancients, though most of their dumps are now overgrown with grass and therefore inconspicuous. The old workings, which are here exceedingly numerous, generally commenced with the sinking of a roughly circular and steeply inclined shaft across the strata and, as good bands of the rock were intersected, stopes were opened out along them. The methods of detachment and treatment have not been determined, but probably did not differ much from modern times.

Remains of the ancient copper workers, as before stated, are exceedingly numerous, countless workings, dumps and slag heaps testifying to their industry. Below the largest of the old workings on the southern line between Talsa and Turamdih occurs the most extensive series of palaeoliths yet found by the writer, many hundreds of these being scattered over the ground at the foot of the hill and have the appearance of having been brought there for treatment. The rough fragments vary a good deal in size, untreated stones being mixed with broken ones and chips, but the general run desirable seems to have been 6 or 7 ins. by 3 to 4 ins. by 1 to 2 ins. thick and from these the implements were fashioned. The pieces are nearly all of a fine-grained trap and the actual source of supply

has not definitely been determined, though very similar rock occurs near Balidi about 3 miles to the south. Higher up in the dump from the workings further pieces and a few broken bouchers are to be found; some of a coarser grained material, but these are mostly small and in all probability mainly fragments of those that broke in mining. Above the workings are some flat rocks pitted all over to a depth of about 1 in. on which the ore must have received a crushing and picking before it was despatched to the smelters below, two crushing stones having been found close by. One of the pitted rocks has a hole about 5 ins. deep and 3 ins. diameter which may have been used for hulling paddy for the workers or for giving the concentrates a final crushing with a pestle for the furnace, but none has come to light in these parts. More recently, however, two broken stone pestles with circular polished handles that would fit a similar mortar have been found near Rakha Mines. Among the palaeoliths at the foot were two stone hammers and two pieces of roughly polished chisels, the former being made from waterworn pebbles of fine-grained trap that probably came from the Korkai River about 6 miles west of here and bear evident signs of chipping and hammering. Slag heaps and the remains of old clay furnaces lie all around and testify to a considerable output of copper at this point. Moving east the next places of importance on the south line are beneath some trees close to Turamdih village and the flat ground immediately west of the railway line, where most of the Turamdih ore must have been treated. Crushing stones consisting generally of flattish roughly circular pieces of trap, or occasionally quartz, with depressions to fit the fingers, are plentiful and some small slabs of pitted rock used as anvil stones lie around, while slag is abundant. Several ring stones have also been found in the neighbourhood. East of the railway line the first place of note is on some small hills close to the road on the northern line of ore where several traperushing stones of varying texture and a few anvil blocks are found. To the south of this the writer picked up a roughly smoothed axe-shaped piece of trap which from its chipped ends, one sharp and the other rounded, may have been used as a wedge. From here we come to Chandar Buru where the workings and remains have already been described. The flat rocks above the south line workings are pitted like those near Turamdih with a similar deep hole in one of them and the rejected material, showing malachite, lies around. Slag heaps and the remains of old furnaces abound all round the foot of the hill, while to the south-east is a place where hornstone and quartzite cores and flakes occur in profusion, not far from the banks of the stream which comes down from Dadi. Following the heaps of slag eastwards towards Goradi crushing and anvil stones occur with these, while not far from the banks of the stream on ground that has since been cultivated formerly

stood the remains of a battery of six old furnaces. The plan drawn from measurements taken before their destruction will

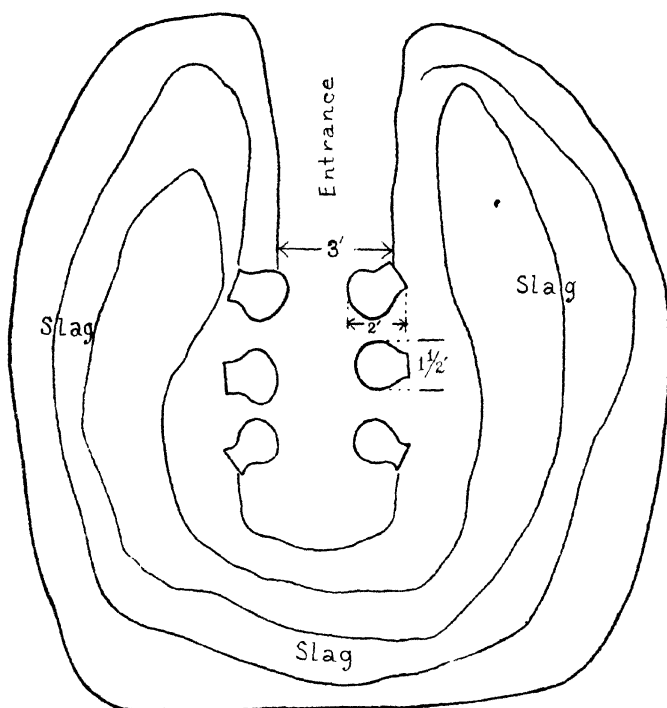


FIG. 1. Old Copper Furnaces, Chandar Buru.

show the layout, and a portion of one of the clay tuyeres remained on the ground. This was cylindrical, about 9 ins. long and 3 ins. in diameter with a pointed, slag-covered nozzle, the air passage tapering from about 1 in. to half an inch at the point. Only the hearths of the baked clay furnaces remained, 18 ins. wide by 2 ft. long, of the shape shown. Smelting must have been much the same as at the present day for iron, air being supplied from foot-worked leather bellows to clay furnaces about 3 ft. high. The bellows are rounded hollowed out blocks of wood open on the top over which a piece of hide is tied, while to the centre of the leather a cord is attached with the other end tied to a flexible stick planted in the ground, a hole being cut in the hide for the entry of air. A pair of these is placed side by side slightly sunk into the ground at a convenient distance for the operator's feet and air supplied by the bellows man marking time and closing the air vents with his feet on

the downward stroke while the spring of the stick raises the leather again as soon as the pressure has been released. A bamboo pipe taking off from each leads to a clay Y which joins the tuyere, one set being generally sufficient for each furnace though two are sometimes used. The blower's balance is often assisted by a sapling with one end sunk in the ground so that he can grasp the clear end with his hands.

The fire having been lit and charcoal blown up to a good heat the powdered ore is fed into the furnace with charcoal and in copper smelting either iron ore or kankar lime were used to flux the siliceous gangue. Considering the crude methods employed a remarkably clean slag resulted, but in two places where the ancients seem to have tried apatite-magnetite rock as a flux their metallurgy resulted in numerous small shots of copper remaining in the slag.

Immediately south of Goradi village is some stony undulating ground with spare vegetation, the knolls running towards the Dadi nallah. In a small hollow on one flank of the most easternly of these, just above a newly excavated tank, is a bed of solid laterite from 6 ins. to 2 ft. thick and about 60 ft. by 30 ft. in extent. A little way west of this bed three stones are stuck upright in the ground forming a rough line, the centre one protruding about 15 ins. and the other two 6 ins. each.

Both Hos and Mundas have from times immemorial been accustomed to mark their burial grounds in a similar manner by groups of monoliths, but these are as a rule anything from

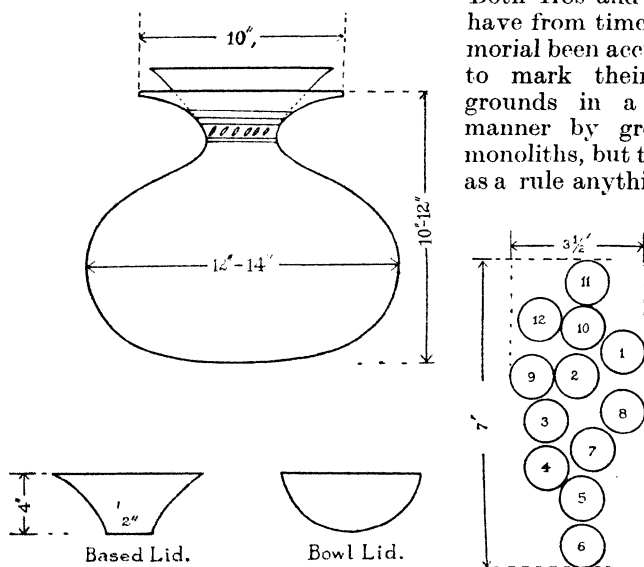


FIG. 2. Burial Urns, Goradi.

3 to 10 ft. high and large flat slabs of stone cover the earthenware pots that contain the remains of the bones of the dead.

These slabs may weigh anything from 1 to 15 cwt., though heavier are known, the size generally depending on the amount of influence the deceased possessed. At the present day, however, many of the Mundas have deserted this method for ordinary burial, the corpse being covered by earth over which any large stones lying around are laid, while the 'parkom', or string bed with wooden frame, belonging to the deceased is placed upside down on the top.

An open hole in the ground near the three standing stones being unusual, an investigation was undertaken when this was found to be a cemetery presumably of the ancient miners. Though stone slabs are easily procurable in the vicinity none covered the urns and digging proved that these people had been in the habit of stopping the mouths of at least some of the pots with a small clay bowl. Altogether twelve clay urns were

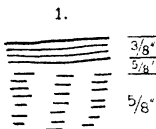
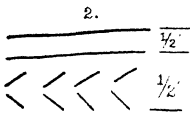
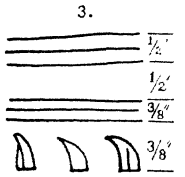
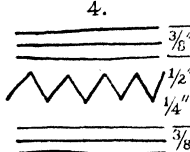
1.  1. Micaceous clay. Wide top. Few bones, charred.
2.  2. Micaceous clay. Wide top. Based lid. Many bones.
3.  3. Ordinary clay. Based lid. Many bones and piece of copper.
4.  4. Quartzose clay. Wide top. No lid.

FIG. 3(a). Urn Neck Patterns (1-4).

extracted on the south side of the stones, from a plot about 7 ft. by 3½ ft., in the hope of finding some relics that would give a clue to the times to which they belonged; but probably more exist here as well as on the opposite side of the stones.

The majority of the urns were made from a micaceous clay that seems to have been peculiar to the ancients and is no longer used, while the shapes and markings are more elaborate than at present. The pots varied in shape and size, being from 10 to

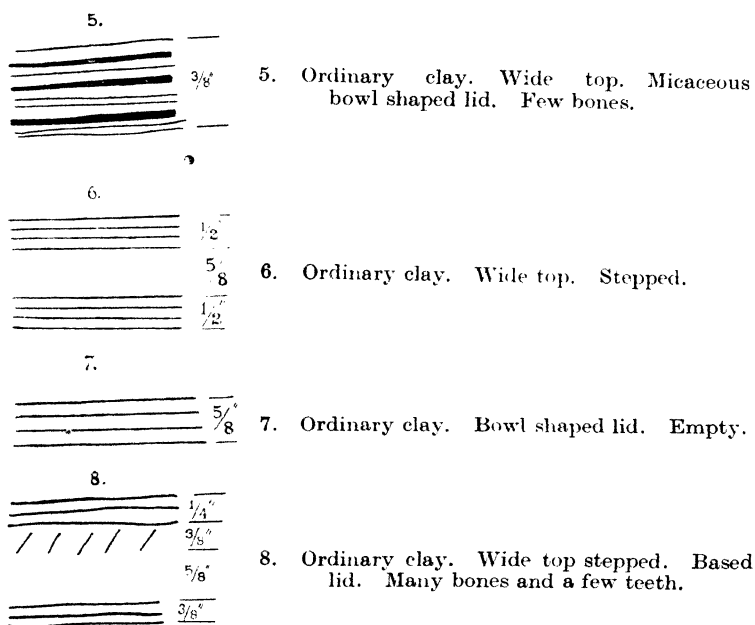


FIG. 3(b). Urn Neck Patterns (5-8).

12 ins. high and 12 to 14 ins. wide at their maximum, while the neck of each, which varied from 4 to 6 ins. in width, bore distinctive marks. Beyond broken bones, some of which seemed to be very slightly charred, some teeth and small pieces of copper oxidized to malachite, that may have been part of a chain, nothing was found. Owing to their broken state none of the urns could be preserved intact, but nearly all possessed widely turned back tops, while the small clay pots that filled the necks were of two kinds, one shaped like an ordinary bowl and the other with concave sides and a small flat base, the average size being about 8 ins. in diameter by 4 to 5 ins. deep.

A little way above the cemetery crushing stones of the usual type were fairly plentiful, while among them lay three neolithic celts and one flat stone about 15 ins. long by 7 ins. wide that had a groove caused by grinding. A portion had split off this stone at one end and both pieces had laterite attached to them along the sides of the crack. The nearest portion of the laterite bed is about 30 ft. away and there are

no means of ascertaining whether this has been formed since the ancients worked here or how far up the knoll it originally extended. Broken pieces of pottery lie about and in various places small heaps of slag, many pieces of which are cylindrical with

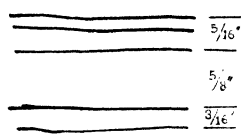
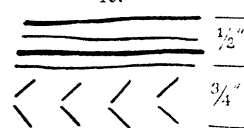
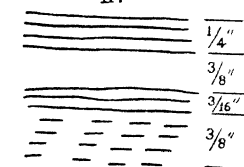

- 9.
- 
9. Ordinary clay. Large teeth. No bones
- 10.
- 
10. Micaceous clay. Ordinary clay. Bowl shaped lid. Some bones.
- 11.
- 
11. Thick micaceous clay. Wide double lined top. Few bones and one bit of a tooth.
- 12.
- 
- 12 Thin dark clay. Narrow single lined top with ledge. Few bones and teeth.

FIG. 3(c). Urn Neck Patterns (9-12).

vesicular surfaces and vary in size from about one inch to a quarter inch in diameter. Along with these are other pieces with semi-circular indentations which fit the cylinders, but the object and method of manufacture have still to be ascertained as well as the reason why such slag should be confined to this locality.

On the way from Kudada to Dadi, close to where the road crosses the railway line, occur two main lots and some scattered slag entirely different from the usual iron or copper slags of these parts. It varies considerably in colour, the greater portion being a light brown shading to the usual black, is porous and full of large cavities which look as though some crystalline

material formerly existing had since been leached out. In the darker material malachite stains are sometimes visible as well as long acicular crystals, which under the microscope are shown to be mullite. Both blue and white quartz veins occur in slate in this locality, while a tufa limestone deposit is found about half a mile to the west and small fragments of pottery with crushing and anvil stones are plentiful. For a long time the origin of this slag could not be determined until one day some years ago the writer was informed that beads had been made here in the distant past by a small old man who lived on Dhoba, the mountain above the village of Bonidi. Further enquiry elicited the information that they were sometimes found during the wet weather washed out of the ground and as the rains were then on, an immediate search was undertaken. The recently ploughed ground above the village soon produced some red and yellow beads, the former of which under the microscope proved to be made of a devitrified glass and the latter of terracotta, so the village children were put on to collect as many as they could. The result was that a supply started coming in and with the glass variety quite a number of polished stone ones. The majority of the composition beads are cylindrical and a brick red colour, varying in size from 13 mm. long by 6 mm. in diameter down to sections 5 mm. in diameter by 2 mm. thick, while some of the larger cylindrical pieces have been pressed flat before hardening and pinched near both ends, or cast to this shape. Nearly all the yellow beads hitherto found consist of sections which vary in size from 6 mm. in diameter by 2 mm. thick to 2 mm. in diameter by 0.75 mm. thick. Quite a number of blue and green beads also appeared, but these are generally roughly rounded and considerably more glassy than the others. The colouring matter of the blue and green beads is, as one would expect, copper, while an assay of the red devitrified glass ones gave results of 1.72% Cu and 1.68% Fe and the yellow ones also contained copper.

The stone beads are commonly made from carnelian, agate, onyx, or crystal either roughly rounded or flattened after the composition pattern, or faceted with eight or twelve faces, the last idea having doubtless been derived from quartz crystals. The largest bead is 23 mm. long by 16 mm. in diameter at the widest portion, diminishing to 6 mm. at the ends; while the rounded agate and jasper ones vary from 16 mm. in diameter. One quartz bead about 15 mm. long was shaped like a fang with a horizontal hole drilled through the thick end, while another one was a flattened hexagonal prism made of black hornstone and a third a cylinder of green epidote hornstone, both these rocks being establishable in the locality.

For threading, holes have been drilled from both ends and the alignment is frequently so faulty that these have scarcely met, the sizes varying from 1.5 mm. downwards. The means

and method of drilling have still to be ascertained, but supplies of kyanite-topaz-corundum rock are obtainable about 3 miles away, where a few stone implements have also been found. Lying among the relics of the beadmakers were two broken ringstones, one of a grit that occurs on the northern slope of the hills and the other of an iron-stained siliceous slate from the top of Dhoba Buru. Articles of baked clay were also found, the first a ball about 36 mm. diameter with a 6 mm. hole through the centre that served some undetermined purpose and a reel that probably once held the line on which the beads were threaded. Other items of interest were one white glass bead partially overlaid with beaten gold that had been stuck to the glass by lac, a piece of beaten gold lying in the soil and a portion of what looked like thick copper wire 40 mm. in length by 4 mm. in diameter. On cleaning up one end this was found to have a centre of red copper, an intermediate ring of black copper and an exterior of polished malachite. From the curve on it this may have been a portion of a bangle, or by cutting off slices and drilling out the red copper core it would have formed beads almost identical in shape to the smaller terracotta and stone sections. The only remaining article of interest was a pointed iron punch 75 mm. long and 20 mm. square, but of doubtful age.

The beads having been found scattered over the area it is impossible to say how they were strung in ancient times, but the greater portion of a necklace of col-de-chien length has been found with a burial urn and remains of bones near the village of Banabassa on the south side of Chandar Buru. This consisted of seven oblong and eleven rounded stone beads, nine flattened double-necked composition ones, one green one of same shape and one red cylindrical one 3 mm. wide by 5 mm. in diameter.

Stone beads of many types are recorded to have been found by Bruce Foote in Southern India, ascribed to Neolithic times, and on a comparison with those in the Madras Museum the writer has been able to find several similar to the Bonidi beads. Many neolithic beads seem to have forms common to both Europe and Asia, but the most striking discovery comes from a find from Montapalam in Pondicherry where the uncommon flattened barrel with lined ends shape occurs. A French authority¹ ascribes this type to Phoenician influence though the writer has hitherto only been able to find this form in beads from Mohenjo Daro and Ür and not among Phoenician beads in any museum visited.

Some years ago some rounded carnelian beads and a barrel-shaped onyx one were dug up at Kundrukocha not far from where the old gold workers' grinding stones are, and some of the

¹ Numa Laffitte—Rapport D'ensemble sur les Fouilles Exécutées dans le sud De L'Inde, Paris, 1932.

older men of the surrounding villages still have a few that have been picked up from time to time. More recently a trap ring-stone and various other stone implements have also been found in this locality, of types similar to those occurring on the copper belt and pointing to both the copper and gold workings having been made by the same people.

Following the copper belt eastwards, little of interest beyond old workings, occasional palaeoliths and cores and flakes, is to be found between Goradi and Rajdoha, or between this and Rakha Mines; but just beyond this last place on a spur that runs north from Sideswar we come to the ruins of Roamgarh, situated on the most elevated portion. This spur, which has a flat top, is exceedingly steep on all sides except where it is

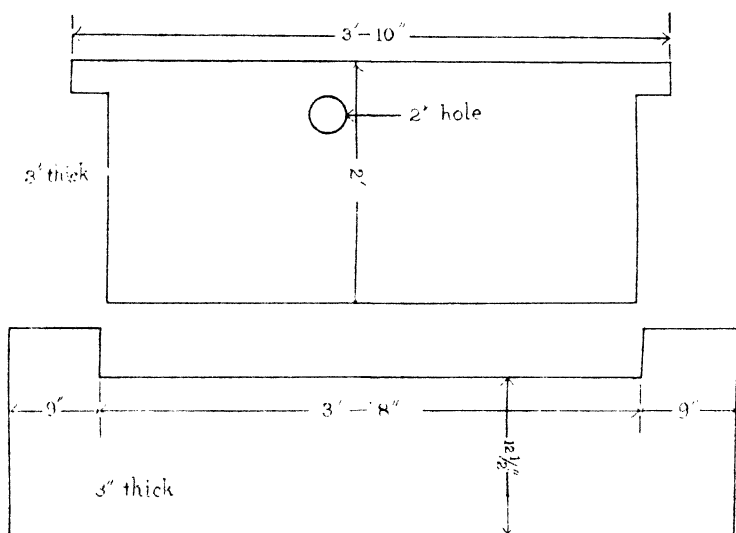


FIG. 4. Stone Door (?), Roamgarh.

joined to Sideswar by a thin ewe neck, while covering the top and extending along the neck to where it commences to dip is the remnant of a thick bed of laterite which presents a vertical face of about 15 ft. to the slope on the west and what look like two or three 6-8 ft. terraces roughly cut out of the laterite to the north and east. The laterite bed extending along the neck has the appearance of a causeway, but comes to an abrupt end in a face about 15 ft. high, at which point the width has narrowed down to about 8 ft. The strength of the position from a defensive point of view, except where a supply of water is concerned, is very evident and the view commanded therefrom embraces all the flat country to the east, north and west

and the spurs around Sideswar to the south. On the highest part are the ruins of a circular brick-built watch-tower of which only some 5 ft. now remain, the rest of the brick walls lying scattered around and down the south-eastern slope of the hill. The bricks seem to be of two sizes lightly burned and mixed with rice straw, the smaller $10\frac{1}{2} \times 6 \times 3$ ins. and the larger about $20 \times 10\frac{1}{2} \times 3$ ins., but the length of the latter is uncertain as so far only broken fragments of these up to 15 ins. in length have been recovered. The circular tower, which is now filled with debris in the centre, is set on a brick plinth built on the laterite and covered by spear grass for the greater part of the year. The place is now the haunt of hyenas which have small passages through the laterite leading towards the tower and from the weathered material lying on the floor of these they probably at one time afforded access to chambers cut out of the laterite bed. Some years ago an attempt was made to clean the debris out of the watch-tower until a small hole put through was tested with a long drill and as this failed to find any bottom and liberated swarms of fleas, work was stopped. In 1926, the place was re-visited after a couple of years' absence, when two human skulls¹ were found lying on the flat ground near the northern entrance that had not been there previously. As the writer had been asked to collect skulls by W. P. Pyecraft, these were submitted to him for measurement with the following results:

	Cephalic Index	Nasal Index	Alveolar Index
No. 1 ..	73.4	48.0	101
No. 2 ..	72.3	57.4	102

Near the foot of the plinth on the south side was a flat piece of schistose quartzite sticking out of the ground, 5 ft. 2 ins. long, 14 ins. wide and 3 ins. thick with the central portion of one side cut away to a depth of $1\frac{1}{2}$ ins., while close to it a piece of similar stone 2 ft. wide lay nearly covered by earth and broken bricks. On extraction it was found that the shorter side of this fitted the recessed portion of the other stone while the opposite side had a 1 in. pivot at either end and a circular hole 2 ins. in diameter about midway near the edge. Higher up on the flat ground below Sideswar is a slab of similar rock 10 ft. long by 2 ft. wide by 3 ins. thick, presumably intended for Roamgarh, but abandoned on the way and close to it, the writer picked up a broken stone pestle and various crushing stones though here they are far from plentiful, as further west. Recently on cleaning out one of the ancient copper workings near Roamgarh thousands of pieces of pottery were uncovered

¹ These two skulls have been re-examined by Dr. B. S. Guha in 1935 through the courtesy of the Keeper of the Natural History Museum, South Kensington, London, and a short note will be published in near future.—*Editor*.

in the refuse surrounding the shaft. The higher layers contained only red clay pottery similar to that used in modern times, but

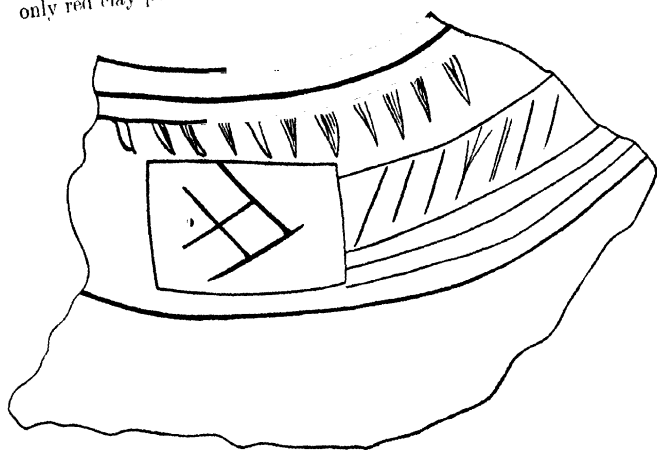


FIG. 5. Pottery, Roamgarh.

as the cut got deeper, this gave place to yellow and often to dark and nearly black pieces of superior manufacture and finally to the elaborately ornamented fragment illustrated. In the same locality was found the broken portion with moustache and eyes, the nose forming a spout used perhaps for pouring

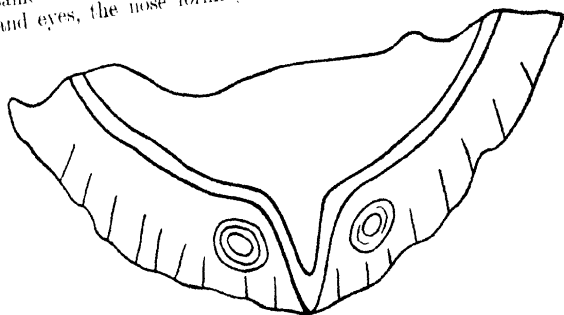


FIG. 6. Pottery, Roamgarh.

oil into the miners' lamps previously discovered in the vicinity. The eyes were black and shiny like slag and firmly fixed in the baked clay. The superior workmanship of the earlier workers was thus again clearly established.

Shrines.

South of Asanboni, near the bank of the Garrha Nallah, and north of Badia beyond Mosaboni in the central portion of the pergunnah, are the remains of two similar shrines. When the writer first knew them many years ago both were deserted, but on subsequent visits to them the former was found to be occupied by a Hindu priest who had collected and replaced some of the scattered fragments. The walls, which had been roughly rebuilt to a height of 2-3 ft., were made of laterite blocks tongued and grooved in many cases to fit one another in one of two ways. The former was to leave a triangular tongue with one inclined and three vertical faces midway near one end that fitted a corresponding groove in another block while the other was to double mortise the centre of a block and have a tenoned piece to accord. Another piece of laterite in the shape

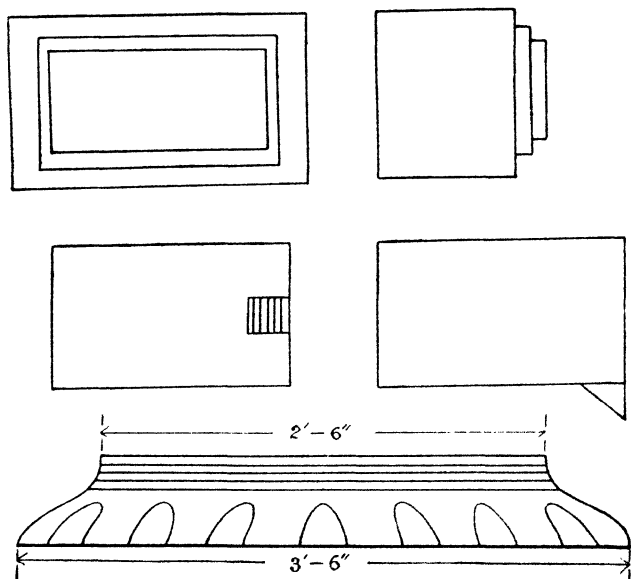


FIG. 7. Wayside Shrines. *a* and *b* Laterite building blocks.
c Pedestal.

of a circular pedestal bore rough carving being stepped near the top and bottom and curved in between. Among the relics dug up by the priest was a slab of hornblende schist about $3\frac{1}{2}$ ft. long, 1 ft. wide and 3 ins. thick that bore figures in twelve panels and ornamentation on either side of them. At the head was a wheel followed in the second panel by a kneeling human figure, a deer, an animal like a rhinoceros, a sitting

human figure, then a standing one, an elephant, a squatting human figure followed by one bending, two human figures, a female figure bending, and a female bust; after which the ornamentation ended in a large standing male figure whose legs and arms were in positions similar to Egyptian carvings, which occupied most of the end of the stone. Unfortunately during subsequent building operations this stone has disappeared. In addition to this were two phalli of similar rock

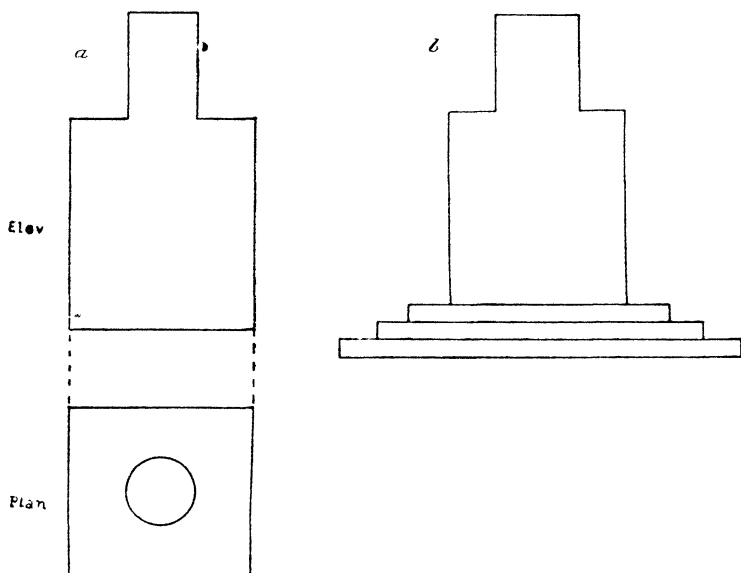


FIG. 8. Wayside Shrines, Asanboni.

and a square soapstone yogi with three projecting bands round the top, centre and bottom and a panel in the centre of two sides which bore a sitting figure, while the top, which was

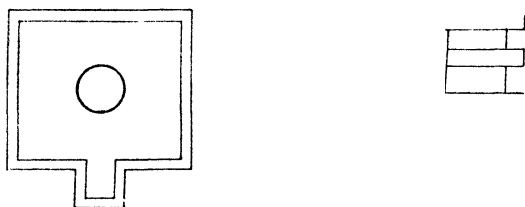


FIG. 9. Yogi.

recessed, had a spout and a circular boss in the centre level with the sides.

This shrine is in such disorder that it is necessary to refer to the one at Badia for a realization of how it formerly must have been. About a mile west of the village of Gohala and not far from the south bank of the Subarnarekha is a cluster of trees some of which seem to be growing from an elevation higher than the alluvial plateau that surrounds them and in the midst of them are the remains of a shrine with walls still standing to a height of 9-10 ft. The outside measurements are roughly 15 ft. wide by 16 ft. long, with the major axis and entrance facing east, and the walls 4 ft. thick made of rectangular laterite blocks of varying sizes, leaving an open space inside 7 ft. 9 ins. long by 7 ft. wide which was once paved with flat soapstone slabs, one of which bore carving in the centre that resembled a four-petalled flower. Two of the inside blocks of laterite, one on the south side of the $2\frac{1}{2}$ ft. wide entrance and the other near the western end of the south wall have niches cut in them with lean to tops and straight sides and bottoms, which measure about 5 ins. by 5 ins. at the points of greatest dimension and are sunk 3 ins. into the stone. Outside close at hand is a circular pedestal of laterite about 3 ft. in diameter and 8 ins. thick stepped and carved in a similar manner to the one at Asanboni. Further away again and beside the path to Gohala is a rectangular carved soapstone pillar, with rounded

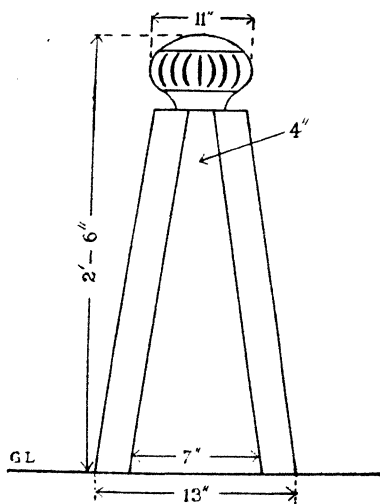


FIG. 10. Gohala Shrine - Soapstone Pillar.

head and neck, which projects about $2\frac{1}{2}$ ft. above the ground. The rounded head is ornamented by a ring near the top and vertical rolls while the rectangular portion which has 11 ins. sides at the top, increasing to 13 ins. at the bottom, has smoothed bands along each side $3\frac{1}{2}$ ins. wide at the top and diminishing to 3 ins. towards the base so as to leave a roughly dressed panel in the centre. Beyond Kuyali on the road to Kundrukocha are the remains of a similar shrine, where the aborigines now offer sacrifices. The usual laterite pedestal and blocks of the same stone lie about or are enclosed in a mud hut covered

by a roof of thatch. Remains of a fourth shrine also occur near the south bank of the Subarnarekha River in Mayurbhanj State near Baragora where a phallus has a metal 'nāg' coiled

around it. The usual laterite blocks and four pedestals, differing in size, lie around. Gravelly mentions the existence of several similar shrines in Ganjam and the northern Telegu country.¹

The ancient gold workers have left many traces of their industry in the southern part of the pergannah, and on the way from Kasibera to Kundrukocha is a large flat grinding stone with a few other slabs of rock which cover clay pots containing broken bones and must have been brought there by a succeeding generation that marked this burial ground by three upright monoliths. The largest collection of grindstones is found in the jungle along the western side of the nallah that comes down from Porojarna and Kerriam where several hundred stones must have been in use; while the next largest of about 100 stones is east of the two Putra shafts, being separated from them by a ridge and nallah which descend from the hills forming the Mayurbhanj boundary. Another lot of about 50 occurs further east where the Rangra spur joins the boundary range and nearly all of the three lots of stones seem to have originated from a band of fine-grained trap that runs up the nallah past the back of Porojarna Hill until it is lost near Putra South shaft in the main range. Why the ancients should have gone to the trouble of carrying heavy stones for about a quarter of a mile over rough country and away from water to the Rangra spur is not evident unless old workings still remain to be discovered in this vicinity. The only other large accumulation of stones occurs to the east of Mangru; and though rock and water are handy here this seems to have even less cause for its existence as no old workings have been found within a mile of the collection. In the circumstances the writer has come to the conclusion that the gold workers, coming from the north, fixed this, being in an open position and comparatively healthy, as their base from which to test the surrounding country, which in those days must have been covered by dense jungle and have had more than sufficient tigers, leopards and bears to add interest to a miner's life. As malaria is also unusually prevalent in these parts in the hills and elephants are not uncommon, the lot of the early workers cannot have been all that could be desired. The grinding stones are almost always made of trap, though occasional ones of quartzite or hornstone are met with, from 2-3 ft. long, 12-16 ins. wide and 4-9 ins. thick. A few that have been wide enough to take two grooves with a dividing ridge on each side are known, as well as one nearly rectangular stone about 3 ft. long by 1 ft. wide and deep that had a groove along each of the four sides and took four coolies to carry, but the regular weight is from 30-60 lbs. Generally both sides were used and grooves worn lengthwise by the forward and

¹ An Outline of Indian Temple Architecture, F. H. Gravelly.

backward movement of a stone muller held in one hand on material that had received a preliminary crushing, sometimes from the back of the muller stone or more often from a stone specially for this purpose. As no anvil stones are found, the same block must have been used for both purposes, the process being continued until the stone cracked with the hammering or a hole was worn through the centre of the grooves. Near the upper end of the largest lot of stones, below Porojarna where the trap widens, a large block on the outcrop has been used for grinding *in situ*, but this is unique in this locality.

The main old workings are found at Porojarna, Kerriam, Rangra and Suraigora while others exist on Jhik, Chailom, Gande and Bin Dungris (dungri = hill), and metal tools would seem to have been mainly used for mining as only three or four doubtful hornstone chisels and one doubtful trap hammer stone have been found, apart from those in the bottom of the Porojarna workings. Had copper been used, some of these implements would probably have survived the passage of time, whereas iron must have been lost by oxidation, so the main work here must have been done during the iron age and probably later than the commencement of that on the copper belt. The finding of stone beads and a ringstone similar to those at Bonidi show that this art was known to the early workers, but if copper slag formed the base of the glass beads, as seems probable and the stone ones were made in the locality, it is not surprising that they are not to be found here as the nearest copper slag is about 20 miles distant.

A place, that might lead to further relics, occurs near Sappora, over the border in Mayurbhanj, where an ancient shaft has a circular stairway leading down to stopes. The bottom of the shaft was filled with debris and countless pieces of earthenware pots, presumably broken while dealing with the water in the stopes. Unfortunately only some of the debris had been cleared in 1917 before orders were received to stop all work and nothing further has been done, though desirable from both mining and archaeological interests.

Summarizing the evidence at present available regarding the ancient workers we have the following:

1. Coins of the third to fifth centuries A.D. near Roamgarh;
2. Tradition and history;
3. Roamgarh and remains of shrines;
4. Burial urns and other pottery;
5. Beads;
6. Palaeolithic and Neolithic tools.

The only definite date that can be fixed from the above at present is that of the Kushan type coins, found in a clay burial

urn with fragments of bones at Rakha Mines, so that the workings must date at least from this period. From the projections left on the sides of the coins these were probably unused and must have been cast in rows in a mould. Similar coins have been discovered south of Chaibassa and in various parts of the districts of Ganjam, Puri and Balasore as well as in the State of Mayurbhanj. If we examine Indian history at the times indicated by the coins, we find that the Kushan empire started to break up with the death of Vasudeva around 220 A.D. and any influence that they had over Eastern India had disappeared by the middle of the third century. Chandragupta, the founder of the succeeding Gupta empire in the fourth century, married a princess of the Lichchavi clan who had Thibetan connections so that either he, or his son Samudragupta, could easily have obtained technical assistance from the Chinese had they required it in the working of the copper mines. In any case, there was considerable trade between India and China over centuries through the port of Tamluk.

Coming next to the legend of the Jains this is as indefinite as the Chinese connection, the religion dating from the sixth century B.C. and continuing down to the tenth century A.D., or 300 years after the time of Harsha, who was visited by Hiuen Tsiang and sent and received missions to and from China. Again, Chota Nagpur formed part of the empire of Asoka, who as a true Buddhist honoured all sects, so that there is no reason why the lay Jains should not have worked the mines during his reign and added to the riches of his empire. On examining the records left by Megasthenes of his sojourn at the court of Chandragupta Maurya, the grandfather of Asoka, more light is thrown on the state of India in those times. The capital of Magadha, the ancient city of Pataliputra, was about 9 miles in length by $1\frac{1}{2}$ miles in breadth, defended by a moat fed by the river Son and timber pallisade that had 570 towers and 64 gates; gold, silver, copper, pearls and precious stones were abundant, some of the gold basins being as much as 6 ft. in diameter while many vessels, definitely stated to have been made of Indian copper, were set with precious stones. During his reign woodcutters, carpenters, blacksmiths and miners were subject to special supervision, while punishment for Brahmans who offended included, being sent to the mines for life. As men, it seems, could not be wholly relied upon, the king had an Amazonian bodyguard obtained by purchase from foreign countries. Jain tradition affirms that he was of their faith and that following a twelve years' famine he abdicated, becoming a Yogi or ascetic. The nearest copper mines of any size to the capital are those of Baragunda in the Hazaribagh district and Singhbhum, so that it seems probable that they furnished at least some of the copper of the vessels used at the court.

Some of the Śaśunāga dynasty, which preceded that of the Mauryas, are also considered to have been Jain and both the Mahāvamsa and Hiuen Tsiang refer to the last of this line as being the possessor of great wealth and being so hated that he was finally deposed. Stoehr and Durr Schmidt have left records of a tank below Roamgarh being attributed to the Jains and the fort of Roamgarh having been built by a Raja who spoke two tongues (do jib). Dalton, however, considers this to mean that he belonged to a serpent (Nāg or Nāga) race, meaning the Kols and it may not merely be a coincidence that the Nandas were of Śūdra origin, having usurped the throne from the former higher caste rulers.

The only other earlier historical reference throws no light on the copper workings, but records that under Darius the Asiatic satrapy used to pay as annual tribute of 360 Euboic talents of gold dust to the Persian empire, or the equivalent of about a million sterling on a normal pre-inflation basis. If burial urns similar to those occurring in Singhbhum could be found in other parts of India and some definite date be assigned to them, a further link in the chain could be forged, but at present this link remains incomplete, as the urns discovered by Laffitte¹ near Pondicherry bear no similarity either in size or markings to those of Dhalbhum. A question that remains unanswered is—why should each urn in the Goradi burial ground have a distinctive neck marking; was a record thus kept of those whose bones each contained and, if so, with what purpose?

A comparison of the beads from Bonidi with those from other places shows that many of the types are almost identical with those recently unearthed at Ur and those from Khorsabad that were in the Louvre. The most striking instances of similarity to Ur are the flattened barrel-shaped stone beads with lined ends, and the terracotta sections, the second shape being also found in Egyptian beads and the first at Mohenjo Daro. The table on p. 103 gives some of the beads found at Bonidi and compared with those in the British Museum, the Louvre and a few from Mohenjo Daro with the dates assigned to those from Ur. Unfortunately few of the beads from Mohenjo Daro have been accessible to the writer in Calcutta or that column would doubtless have more entries, while the Āzamgarh beads are confined to the exhibit in the British Museum. If any connection can be placed on the Ur dates for similar beads at Bonidi, the working of copper in this locality would be carried a large step backward and the connection of stone implements with the manufacture of the beads and the working of the copper would confirm their antiquity.

¹ *Loc. cit.*

	Bon.	Khor.	Phoen.	Sumer.	Ur	M.D.	Azam.	Ur. date B.C.
Blunt end double hexagon ..	S	S	..	S	S	..	..	..
Blunt end round ..	S & DG	S	..	..	S	..	TC	2000
Round ..	S	S	S	..	..	..	S	..
Round with central ridge ..	S	S	S	S	S	..	..	1400
Flattened barrel plain ends ..	S	S	S	S	..	..	S	..
Do. lined ..	S & DG	..	..	..	S	S	..	2000
Cylindrical ..	S & DG	S	..	..	S	..	S	2000
Sections ..	S & TC	S	..	S	TC	..	..	600
Barrel-shaped ..	S	S	S	S	..	..	S	..
Rough, round or flattened ..	S	..	..	..	S	..	..	1900
Fang shape ..	S	..	S	..	..	..	S	..

S = Stone, DG = Devitrified glass, TC = Terracotta.

The dates assigned to the Sumerian beads in the Louvre are from 3000 to 2500 B.C. As glass beads seem to be mainly confined to Bonidi no comparison of these has been possible and bead types unique to Bonidi have been omitted.

It may be argued that the civilization of the present inhabitants of the district is so little removed from that of the stone age that relics of this betoken no great antiquity, but against this may be set the facts that we have one fairly definite date, that all accounts of the working have been lost and that they are to-day quite incapable of doing what has been done in the past. A comparison of the present-day crude open-cast soapstone plate workings with the ordered circular shafts and stopes of the ancients show how much the earlier civilization was in advance of the present, while the smelting of copper and manufacture of beads are not likely to have been entirely lost had they originated, or been common practice, among the tribes of the district in comparatively recent times. The ancient civilizations that existed at Ur, Harappa and Mohenjo Daro seem to have many features in common that can only have originated through intercourse and time may prove that these influences extended further eastwards than has been thought.

BIBLIOGRAPHY.


- BEAL, S.—Buddhist Records of the Western World.
Travels of Fah-Hian and Sung-yun (1869).
CHILDE, V. G.—The Aryans (1926).
DAVIDS, T. W. R.—Buddhist India (1903).
DISTRICT GAZETTEERS of Singhbhum, Manbhum and Midnapore.
DUTT, N. K.—The Aryanisation of India.
KING, W. and POPE, T. A.—Gold, Copper and Lead in Chota Nagpur.
MACCRINDLE, J. W.—Ancient India (1882, 1885, 1901).
RAGOZIN, Z. A.—Vedic India.
Chaldea.
RAWLINSON, G.—Phoenicia.
RISLEY, H. H.—The People of India (1908).
ROY, S. C.—The Mundas and their Country (1912).
SMITH, V. A.—The Early History of India (1914).
- 



FIG. 2. Soapstone Outcrop, Blitar Dadi (South).



FIG. 1. Ancient Soapstone Workings, Blitar Dadi (North).





FIG. 2. 'The Widow', near Kalikapur.



FIG. 1. Shrine and Pillar near Gohala.



Stone Implements from India, Talsu.

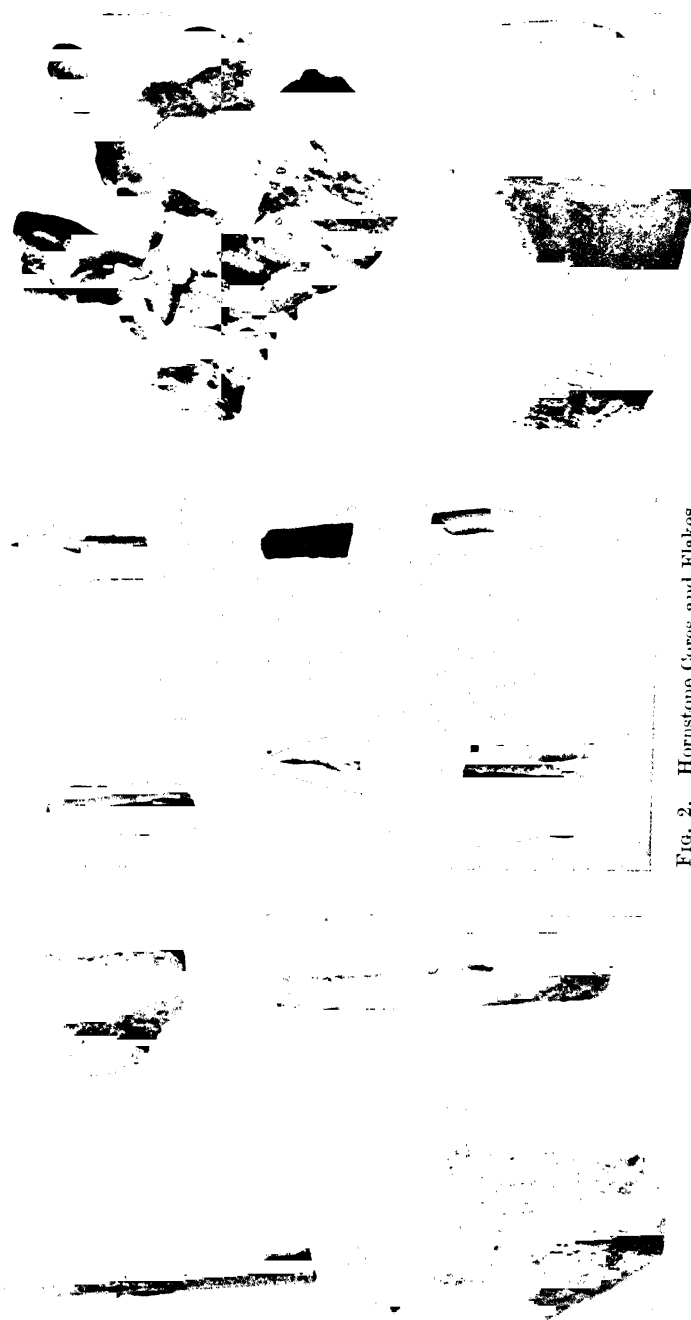


Fig. 2. Hornstone Cores and Flakes,
Banabassa.

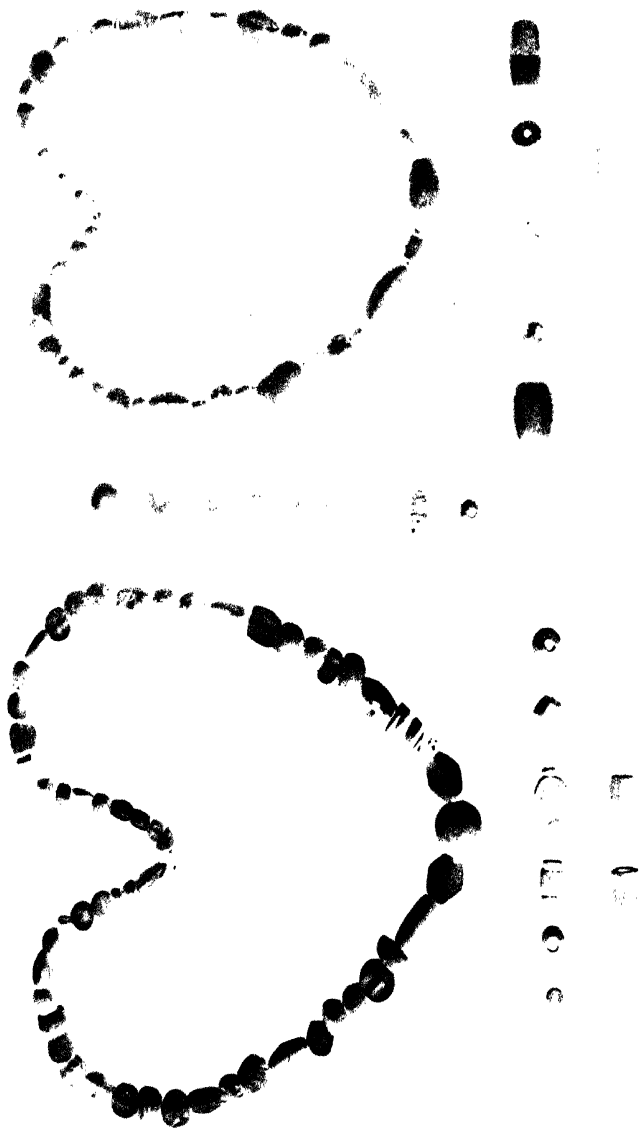


Photo of Beads.

Panegyric of Malaivamma.¹

By CHINTAHARAN CHAKRAVARTI.

The panegyric which consists of eighty-four verses is a rather unique one. The verses form part of a Tantric work² which deals with *Yantras* or symbolic diagrams. The description in it of each *Yantra* is concluded by a verse describing the author's patron or one of his ancestors, children or relatives referred to as having obtained success through the worship of the *Yantra* under description. It is gathered from these verses that Malaivamma, the patron of the panegyrist, who ruled over the hilly country called Rukma, situated on or near the mountain called Tākama, was the son of Ghanaśyāmamalla and Pārvatī (daughter of Vīrabhadra) and grandson of Sāhamalla. It is stated that he married Mahalavasantā, daughter of Dalasāhi and Subhadrā, whose dominions lay on the hill called Khāñci. As many as seven sons were born to the king each of whom has a verse devoted to him. The magnanimity of the king, especially with reference to the author, is extolled and it is definitely asserted that he gave to Premanidhi, the author of the work mentioned above, considerable property and a house in Benares. It is further stated that he consecrated a temple to god Śiva at the confluence of the Maṅgalā and the Gaṇḍakī. He also secured the release of the king of Mustān who was made prisoner in Kākaveṇī by Jumaliśvara. Incidentally the panegyric gives a detailed genealogical account of Malaivamma going as far back as his eleventh ancestor and as far down as his grandsons.

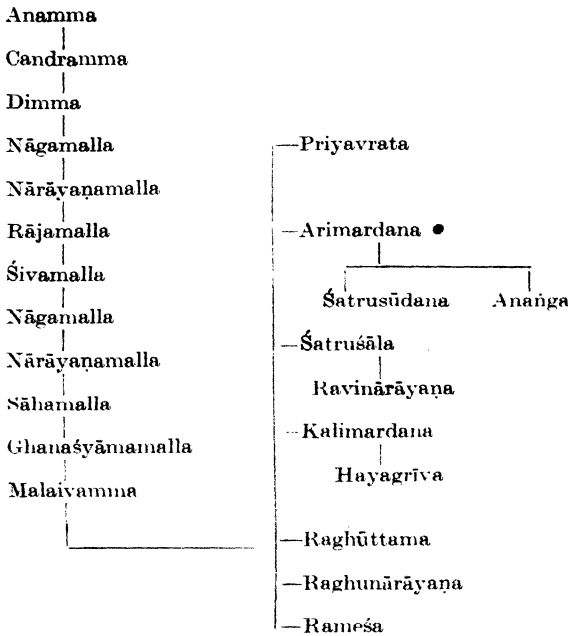
¹ Malaivamma was the king of a principality in Nepal which was later on conquered by the Gorkhas. The country ruled by him was included in the Chaubisi states of the Sapt Gandaki Pradesh of the present kingdom of Nepal. A short but imperfect history of the rulers of this place is given by Hamilton (*Account of the Kingdom of Nepal*, etc., Edinburgh, 1819, pp. 269-72).

I am indebted for this information to Mr. Suryavikrama Gewali, author of *The Life of Prithvinarayan Shah*, published by the Nepal Sahitya Sammelan.

² This is a commentary on the *Yantra* section of the *Śivatāṇḍava* (Chapters XII-XIV). The RASB possesses two MSS. of the work—one complete and the other incomplete.

One MS. of the work was described by Prof. Peterson (*Cat. Sans. MSS. Uwar* No. 2389), but he made no reference to these verses. Pandit Narayana Shastri Khiste also has taken no notice of them in his article on *The Life and Works of Premanidhi* (*Nāgarīpracārīṇī Patrikā*, Vol. VI, 1982 V.S., pp. 371-379).

The genealogical table may be constructed thus on the authority of these verses:—



The author of this panegyric was Premanidhi Pantha who hailed from Kūrmācala or Kumaon. It is learnt from the concluding verses of his works that he was the son of Umāpati and Udyotamati and was a worshipper of Kārtavīrya. Little is known about his life and family. We are told that he had sorrowful bereavements in his family. He lost his beloved wife at a comparatively young age. It seems he thereupon left his ancestral home and came to be settled in Benares where on the completion of his commentary on the *Śivatāṇḍava*, he was given considerable property and a house by his patron and disciple Malaivammadeva. Reference is made to two daughters of his—Mahālākṣmī and Kanakā. This much of his personal history may be gathered from his commentary on the *Śivatāṇḍava*¹ in which he incidentally describes his patron and makes reference to himself.

¹ अस्यादिप्रचुरं हिमांशुदक्षिरं सौभाग्ययुक्तं गृहं
 पूर्वं संहरतो यमस्य मततो दुष्कीर्तिरेव स्थिरा ।
 स्वर्षादिप्रचुरं सुधांशुदक्षिरं सौभाग्यपूर्णं गृहं
 यत्कथं हि मया पुनर्नवतमं श्रीमन्मलैवममः ॥ १ ॥
 मयेत्यस्माद ओष्ठभार्यावियुक्तः प्रकृतपण्यकर्ता विवक्षितः ।

It appears from the introductory verses of the *Sudaraśanā*¹ (commentary on the *Tantrarājatantra*) that he had a third wife, Prāṇamañjarī by name, who composed the commentary in memory of her son called Sudarśana. The name of the father and the mother of this wife are given as Harṣadeva and Harṣamati.

The time when he flourished is roughly indicated by the references to dates of composition given in some of his works. We are told that he composed the *Mallādarśa* and the *Dīpa-prakāśa* in 1648 Ś.E., *Prthvīpremodaya* and the commentary on the *Śāradātīlaka* in 1659 Ś.E., the *Jagatpremodaya* in 1663 Ś.E., the *Prāyascittapradīpa* in 1675 Ś.E. This would point to the second quarter of the eighteenth century together with a portion of the third as the period of his literary activities.

Premanidhi was the author of a good many works on Tantra and Śrīti. He himself refers to some of them. He mentions six works of him at the end of his commentary on the *Śāradātīlaka*, and three at the end of the *Śabdaprakāśa*, while the *Mallādarśa* incidentally refers to the *Bhaktitarāṅgiṇī*. In the descriptive catalogue and the lists of his works based on them as given by Aufrecht and Kane different portions of the same work appear to have in some cases been indicated as separate

किञ्च, रे रे पाप कृतान्ता मांसमयमद्देहापहारात्त्वया

भुक्तिर्मेऽपहृता कृता बत महालक्ष्मीय निर्मातका ।

काश्यामेव मया दृषन्मयम्दे प्राप्ते मलैवम्भतो

विन्यसापरमातृके किल महालक्ष्मीवरो वासितः ॥ २ ॥

महालक्ष्मीय ग्रन्थकर्तुः कन्योक्ता । अपि च,

पिशितमयम्दे किं सत्युना भुक्तिबीजं

हृतममलमकस्मादस्मदेकाग्रितस्य ।

इति महालवसन्नायुग्म मलैवम्भदेवो

दृढकनकसुसुक्तायुक्तमेव ददाति ॥ ३ ॥

ग्रन्थकर्तुर्द्वितीया कन्या यदि कनकापदेन विवक्षिता तदा दृढा कनका
यत्रेत्यर्थोऽपि सम्भवति । अन्यच्च,

किं सूर्यसूनुो तव धर्मराजता बलादुद्वृत्तीता मदुपाश्रयेण हि ।

त्रौमन्मलैवम्भपेण केवलं कृतान्ताताशेष ततः प्रकुप्यसि ॥ ४ ॥

Fol. 37B of the MS. described under ASB. VIII, 6817. Also cf. the last verse of the panegyric.

¹ *Nāgarīpracaṇḍīnī Patrikā*, N.S., Vol. VI (1982 V.S., p. 376, f.n.). The commentary is also attributed to Premanidhi (Cat. Cat. I. 222, II. 46). A portion of the commentary is preserved in a fragmentary manuscript described in ASB. VIII. 6819. An edition of its first chapter on the basis of one imperfect manuscript belonging to the Sanskrit College of Calcutta has been published by Dr. J. B. Chaudhuri (Calcutta, 1940).

works. The same work has also sometimes been referred to under different titles. A brief account of the works on which more or less definite information is available is given below:—

1. *Prayogaratnākara* deals with the rites in connection with the worship of Kārtavīrya. No complete MS. of the work is known. Portions of the work found scattered in different parts of the country made it difficult to form an idea of the exact nature of the work. Eggeling in his India Office Catalogue (I.O. IV. 2595) frankly acknowledges this difficulty. A MS. of the concluding portion of the work belonging to the old collection of the Royal Asiatic Society of Pengal contains a detailed list of contents and thus indicates its extent and reveals its identity. It is gathered therefrom that the work is complete in three parts, each divided into several chapters. The Government Collection of Sanskrit Manuscripts in the RASB contains a MS. of the first three chapters of the second part of the work while MSS. containing the first nine chapters of the first part and the last three of the third part are found respectively in the India Office (I.O. IV. 2595) and the old collection of the Society (No. I.E. 54). Several other chapters, not identified heretofore, are also found scattered in different places. Thus the old collection of the Society contains MSS. of the last chapters of Book II as also first and second chapters of Book III (Nos. I.E. 52 and III. D. 65). A MS. of the first chapter of the last Book has already been described in ASB. III. 2412 and Nep., II., p. 141.

2. *Prthvīpremodaya*¹ (composed in 1659 Ś.E.). The last section of the work appears to deal with *Prāyaścitta*. A fragment of a work on *dāna* found along with the Society's incomplete MS. of the *Mallādarśa* may not unlikely belong to this work one section of which deals with *dāna*.

3. *Jagatpremodaya* (ASB. III. p. 189). The work was composed in 1663 Ś.E. This, at least a part of it, deals with *Prāyaścitta*.

4. *Prāyaścittapradīpa* (composed in 1675 Ś.E.)². A work of the same name composed in 1654 Ś.E. is also attributed to the patrons of Premanidhi—Malaivamma and his wife. A MS. of this work is reported to exist in the library of Rajguru Hemraj of Nepal³.

5. *Dīpaprakāśa* (ASB. VIII. 6511). The work deals with the rite of dedicating lamps to Kārtavīrya. The topic also covers the first chapter of the last Book of the *Prayogaratnākara*.

¹ I am indebted to Mr. P. K. Gode, Curator of the Bhandarkar Oriental Research Institute, for kindly supplying me with a description of the fragmentary MS. of the work belonging to the Institute.

² Kane, *History of Dharmaśāstra* (p. 713). The concluding verses of the Commentary on the *Śāradātīlaka* refers to the work.

³ I am indebted for this information to Mr. Suryavikram Gewali of Darjeeling.

6. *Śabdaprakāśa* (ASB. VIII. 6511A). This constitutes a commentary by the author himself on his *Dīpaprakāśa*.

7. *Bhaktitarāṅgiṇī* or *Bhaktatarāṅgiṇī* referred to in the *Mallādarśa* as well as at the end of the *Sabdaprakāśa*.

8. Commentary on the *Śāradātilaka* which is stated to have been composed in 1737 A.D. and a MS. of which is mentioned by Stein in his Catalogue of the MSS. of the Raghunath Temple Library, Kashmir (p. 237).

9. Commentary on the *Śaktisaṃgamatantra* (Cat. Cat. I. 364, 623).

10. *Mallādarśa*, a commentary on the *Yantra* section of the *Śivatāṇḍava*. The RASB possesses two MSS. of a work of this name—one of which refers to Premanidhi as its author, while the other, which is incomplete, is bigger but anonymous and has slight occasional agreements with the former. The MSS. are described in ASB. VIII. 6817, 5971. Though the name of the author is not indicated in the latter MS., it has most of the introductory verses of the former and it refers to other works of the author in terms that clearly point to Premanidhi as its author as well¹. The date of composition of the work is stated to be 1648 Ś.E. (Khiste, *op. cit.*, p. 374).

The verses of the panegyric of which only the first one is found in the portion preserved in the incomplete MS. (Fol. 123A of the MS. described under ASB. VIII. 5971 where it is wrongly attributed to Ghanaśyāmaṃalla) are published below on the basis of the complete MS. (ASB. VIII. 6817). It will be noticed that the verses are full of corrupt readings which cannot be corrected without the help of other MSS. It is however expected that the published text, though corrupt, will be helpful in the study of the history of the Varma of Nepal.

LIST OF ABBREVIATIONS USED IN THE PAPER.

ASB.—Descriptive Catalogue of Sanskrit Manuscripts belonging to the Government Collections in the Asiatic Society of Bengal.

Cat. Cat.—Catalogus Catalogorum, by T. Aufrecht.

I.O.—Descriptive Catalogue of Sanskrit Manuscripts in the Library of the India Office, by Eggeling.

Nep.—Catalogue of Palm-leaf and Selected paper MSS. belonging to the Durber Library, Nepal, by H. P. Shastri.

¹ इत्यादिकमधिकमस्तत्कृतभक्तिरत्नरत्निष्ठादिग्रन्थादवश्यम्—Fol. 104A.

TEXT OF THE PANEGRIC.

- Fol. 24A, विविधतरनराणां पालने भूरिद्धा[भा]रो
हरिचरणसमर्चाचेतसो नैककस्य ।
भवति सङ्गनयोग्यो ह्येतिकान्तादितौयः
समवति नरलोकं श्रीमल्लैवमभूपः ॥ १ ॥
- 26A, महलपदमुपात्तं भाषया मेहराजे
सततमिह वसन्तस्तत्कृपातोऽथवैषा ।
स्वयुतवृत्तिदत्ते तत्र वाञ्छावसन्ना-
स्त्वितिमहल्लवसन्ता नाम राज्ञ्याः कृतार्थम् ॥ २ ॥
- 26B, अस्तुत्तरस्यां दिशि दक्षिणामकी
देशस्तस्माकमसंज्ञपर्वते ।
आनमभूपालवपुःसमाश्रितो
मत्वा प्रजाः पालयति स्म केशवः ॥ ३ ॥
- 27B, चन्द्रमनामवृत्तिर्द्विजशब्दविद्यात्
तत्तद्विनोदविनिवेदिनभूरिवित्तः ।
आनमभूपतनयः सकलाः प्रजा यः
स्नानन्दिताः किल चकार नकारसूतः ॥ ४ ॥
- 28A, चन्द्रमभूपादुद्भूदपूर्वी
राजाधिराजः किल दिग्गनामा ।
यस्मिन् मर्चौ शासति नाकवाक्का-
दरिद्रताभूदखिलेऽपि लोके ॥ ५ ॥
- 28B, त्रीदिग्मभूपालमुत्तस्वपूर्वी गुणैरभूदुद्भूपतिनागमजः ।
नागः प्रजा अस्य कदापि चक्रुः सुनौतिकेतुस्तदयं तु नागः ॥ ६ ॥
- 29A, त्रीनागमज्जादुपमादरिद्रो
बभूव नारायणमज्जभूपः ।
यस्मिन् क्षितौ तिष्ठति देवलोको
लक्ष्म्या विहीनोऽभवदाग्नशोकः ॥ ७ ॥
- 29B, बभूव नारायणमज्जभूपतः त्रीराजमजः क्षितिपालकाप्रचोः ।
प्रजाव्रजारक्षकर्मतो भृशं राजेतिनामार्थयुतं चकार यः ॥ ८ ॥
- 30A, त्रीराजमज्जनयो विनयाम्बुराशिः
सन्मानिताखिलधरासुरकावतंसः ।
स्त्रीयप्रतापपरितापितवैरिसार्थं
आसीदसीमगुचकः शिवमज्जभूपः ॥ ९ ॥

- Fol. 30B, नरपतिशिवमल्लादुदुगतो नागमल्लः
 क्षितिपतिवरमौलिप्रस्फुरद्रत्नभूतः ।
 निजगुणगणवयैरद्वितीयो द्वितीयः
 सकलवचिरगोष्ठीस्वागतः स्वप्रसङ्गः ॥ १० ॥
- 31A, बभूव नारायणमल्लभूपो द्वितीय उर्वीपतिवन्द्यपादः ।
 यो नागमल्लस्य पितुर्वियोगं विस्मारयामासतरां प्रजानाम् ॥ ११ ॥
- 31B, अस्मिन् नृपालरत्नाकरे तु वंशार्णवे तस्मात् ।
 विद्वज्ज्ञो हेतो जातः श्रीसाहसमेन्दुः ॥ १२ ॥
- 32A, घनश्याममल्लो घनश्याममग्नौ
 नृपः कोऽप्यभूत् साहसमल्लवि[क्षि]तीन्द्रात् ।
 यदीयप्रजानां विषादः शिवाग्नौ
 परो नीतिसङ्गादनीतिश्च मङ्गात् ॥ १३ ॥
- 32B, घनश्याममल्लक्षित्तीन्द्रस्य पुत्रो
 नृपः श्रीमलैवमनामा सुरद्रुः ।
 हरिर्वा रविर्वा विधुर्वा स्मरो वे-
 त्यलं सर्वधर्मः सतां संशयक्ष्मा ॥ १४ ॥
- 33A, हरिमदनशशाङ्कस्वद्रुमान्वादिशङ्का-
 परिहृतिकरणाय श्रीमलैवमपत्यौ ।
 इह महल्लवसन्ना नाम कृत्वेन्द्रिरैव
 प्रणिभवति धरायामर्थिसार्थार्थहेतुः ॥ १५ ॥
- 33B, श्रीमन्मलैवमनृपालस्तनवः
 सद्योदराः सप्त मताश्चिरायुषः ।
 प्रियव्रतस्तेषु कुमार आदिमः
 कुमारमारादिविजिह्वरः ॥ १६ ॥
- 34A, पुत्रोऽसावरिमर्दनो नरपतेरास्तेद्वितीयो गुणै-
 राद्यः सदुविनयादिना निजवशीभूतोभवदुविश्वकः ।
 योऽरीषां बलतः प्रतापदहनज्वालोपशान्त्यादितः
 सत्प्रज्ञैरिमर्दनेत्यभिधया संयोजितः सार्थकः ॥ १७ ॥
- 34B, गुणैर्युतस्यापि गुणैर्मितश्च श्रीमन्मलैवमनृपालः
 अथेन नाम्ना च स शत्रुशालः शत्यार्थकं शालमिदं त्विहास्ते ॥ १८ ॥
- 35A, कलिमर्दननामास्ते तूर्यः श्रीराजसत्पुत्रः ।
 कलियुगविभवजयायानुत्पत्त्यान्वर्थसंज्ञोयम् ॥ १९ ॥
- 36A, भवति रघूतनामा पुत्रः श्रीभूपवर्थस्य ।
 यः संख्यापि कान्था धत्ते कन्दर्पमानत्वम् ॥ २० ॥

- Fol. 38A, रघुनारायणनामा राजकुमारो जयति षष्ठः ।
आजन्मार्जितदुःखध्वान्ने रविरिव हि यन्नाम ॥ २१ ॥
- 38B, भानुचन्द्रवलिकर्णसमुद्रचित्यनङ्गुणवामिति किं च ।
सप्तमः क्षितिपतेस्तु कुमारः श्रीरमेश उदितश्च रमेशः ॥ २२ ॥
- 39A, श्रीमन्नृपालतनयादरिमर्दनाख्याद्
अभ्युदगतो बुध इवात्र सुभांशुदेहात् ।
यः शत्रुसूदनपदेन गतः प्रसिद्धिं
स ख्यादरातिमयनेन यथार्थनामा ॥ २३ ॥
- 39B, अरिमर्दनराजेन्द्रकुमारस्यापरः सुतः ।
अनङ्गनामा सध्वङ्गशिरोमणिजराग्रणीः ॥ २४ ॥
- 40A, रविनारायणनामा पुत्रः श्रीशत्रुशालस्य ।
रविनारायणतेजा बोभ्रयाद्भृङ्गरिकरुषातः ॥ २५ ॥
- 40B, कलिमर्दननाम्नोक्ति पुत्रो नाम्ना जयघीवः ।
भवतु जयघीवकृपावशेन तल्लभ्यवस्त्वाद्यः ॥ २६ ॥
- 41A, मङ्गलागण्डकौसङ्गमे पुण्यदेशे
अदया साधुभिर्दर्शितेनाध्वनैव ।
यः किलोमापतेर्घाषजं सद्य चक्रे
तन्मल्लैवम्भतो नित्यमौख्यास्तु पृथ्वी ॥ २७ ॥
- 41B, कस्मात् स्वर्गं त्रिदशाः समस्ताः
शिलास्वरूपा विहिता हिता नः ।
इतीव बध्नाति हि गण्डकीं द्राक्
श्रीमन्मल्लैवम्भल्लोकशास्ता ॥ २८ ॥
सकलसुखहृदा मे वल्लभेन विनेत्रो
रक्षमि समुपनीतो गण्डकीनामवध्वाः ।
भवसि किमिति विघ्नं तत्र याता पुरस्ताद्
इति मङ्गलवसन्ता मङ्गलां किं ववन् ॥ २९ ॥
- 42A, यो लौल्यैव सकलामरराजमौलि-
रत्नानि नैजघ्नतिकर्मक्षते ददाति ।
तं रावणं मृदितपुष्पमिवाकरोद् यः
कारागृहे कमपि तं भज वैश्येशम् ॥ ३० ॥
- 43A, अद्यापि दारिद्र्यपदस्मिरल-
सङ्घिष्णुभिः कर्णमुच्चैः कृतं किम् ।
इत्येव मत्ता भुवि कल्पवृक्षः
श्रीमन्मल्लैवम्भतम् प्रयातः ॥ ३० ॥

- Fol. 45A, किमिति भजति शिष्टान् प्रीतितो निस्सुतेयं
परपुरुषनिविष्टेत्येव राज्ञी सुहृष्टा ।
किम् मङ्गलवसन्ता द्वेषार्थं तयोर्द्रोम्
इह भवति सुयन्त्रे साधकालीवरिष्ठा ॥ ३१ ॥
- 47A, श्रीमन्मलैवन्मन्त्रपालवैरिणां दुष्क्रीर्तिकान्ता निजसन्नतिं किम् ।
समीक्षमाना विदधात्युपासनाममुष्य जाता यदखण्डसन्नतिः ॥ ३२ ॥
- 47B, मुक्ताङ्गभूपतिवरं किल काकवैष्णं
• खड्गं खदर्पवशतो जुमलौश्वरेण ।
संमोक्षयन् करुणया स्वसमूहलेन
प्रत्यर्चिष्टमखिलं जयति स्म राजा ॥ ३३ ॥
- 49A, श्रीमन्मलैवन्मन्त्रपालवैरिणा
प्रायस्खिदं यन्त्रमुपासितं पुरा ।
न चेन्मनोज्ञा पतिदेवतोत्तमा
लभ्येत कान्ता कथमिन्दिरा परा ॥ ३४ ॥
- 49B, मङ्गराजस्य राज्ञी च साधकौ पूर्वजन्मनि ।
आनुकूल्यं यतोऽन्योन्यं त्रिवर्गपरिवर्धनम् ॥ ३५ ॥
- 50A, श्रीमन्मलैवन्मन्त्रपालवर्थः प्रायस्खिदं साधितवान् पुरैव ।
यस्मादमुष्यारिवरौघनार्थी रणादपेतं मृगयन्ति कान्तम् ॥ ३६ ॥
- 50B, मलैवन्मभूपः प्रमत्तस्माराण्य-
द्विपं स्त्रीयससर्गतो मत्तनादम् ।
शृष्टिं सद्दिवेकं समाश्रित्य यन्त्रा-
दितो दूरदूरं चकारातिवेलम् ॥ ३७ ॥
- 51A, साधितं नृपतिना भुवमेतत्
पूर्वमेव जुमलौश्वरमुख्यैः ।
यत्कृतापि किल विधिना किल
कृत्या निष्फलपदवीमुपभुङ्क्ते ॥ ३८ ॥
- 51B, ताकमनामकशैलो न न्यूनो नाकतो भवति ।
राजेन्द्रः करकल्पः शची तु राज्ञी कृपाधेनुः ॥ ३९ ॥
- 52A, मलैवन्मभूपत्रजारातिचेतो
न चैकत्र देशे स्थिरं जालपीडि ।
ततो वेष्टि सत्यं पुरा जन्मनीदं
स्वसाध्वीकृतस्वामिकं चारुयन्त्रम् ॥ ४० ॥
- 52B, श्रीराजराजेश्वरजित्यदीपदानप्रभावाद्वायितारिपक्षः ।
अथन्यशिक्षार्थमिदं सुयन्त्रं संसाधयामास मङ्गलकपालः ॥ ४१ ॥

- Fol. 53A, यो यौवनेपि विषयस्यूहया विहीनो
भूत्वा प्रभुः शिवपुरीमविमुक्तसंज्ञाम् ।
गत्वा यथाविधि कृतत्रिपुरारिपूजा-
गङ्गावगाहनमुखः कृतकृत्य आसीत् ॥ ४२ ॥
- 53B, सेतुसंस्थधरणीं विदुषे यः
अदया कवलितो यदुभर्तुः ।
प्रीतये प्रणिददाति स राजा
साधकोत्र गदितः करुणाभिः ॥ ४३ ॥
- 54A, सुवर्णधेन्वादिकदानतः सतां
दारिद्र्यादावानलकालवारिदः ।
श्रीमन्मल्लैवमन्त्रपाल ईदृशो
यन्त्रेऽपि जातः किल साधकापणीः ॥ ४४ ॥
- 54B, सङ्क्षयः सन्तु नृपाः प्रथिव्यां
नामुष्य कुत्राप्युपमालवोपि ।
अहर्निशं पण्डितमण्डलीस्थो
यः श्रौपतेरेव करोति चर्चाम् ॥ ४५ ॥
- 55A, सदा महाभागवतं पुराणं
तथा महाभारतमुख्यमन्यत् ।
श्रीकृष्णलौक्याचरितानुवादि
प्रियं मल्लैवमन्त्रपालस्य नान्यत् ॥ ४६ ॥
- 55B, श्रीराजराजेश्वरवर्मराजपाठेन नित्यं क्षपितोपसर्गः ।
श्रीमन्मल्लैवमन्त्रपालो निसर्गसिद्धातिदानावितसाधुवर्गः ॥ ४७ ॥
- 56A, पदे पदे सन्ति नृपाः प्रजानां
करग्रहाद्यैर्मनैकदत्ताः ।
श्रीमन्मल्लैवमन्त्रपालोपमातः
क्वावासमेवा लभतां प्रथिव्याम् ॥ ४८ ॥
- 56B, अलम्बकामो नृपतेः परस्मात्
सन्त्यज्य सन्त्यज्य परं तमर्थी ।
सर्वोऽपि लब्धार्थ इहल्लि तूष्णं
श्रीमन्मल्लैवमन्त्रपालाश्रयेण ॥ ४९ ॥
- 57A, सर्वप्रजाक्षेत्रसुरक्षणीदुरः कथं मल्लैवमन्त्रपालकापणीः ।
भवेन्न चेत् पूर्वभवे विधानतः स्तूपासक्तो यन्त्रपतेरमुख्य तु ॥ ५० ॥
- 57B, असुना प्रथिवीश्वरेण किं प्रथमे जन्मनि साधु साधितम् ।
न हि यन्त्रमिदं न चेत् कुतो गतदस्युन्नजभीतिक्काः प्रजाः ॥ ५१ ॥

- Fol. 58A, यथा पयशपूरादिकूटदुर्गजयोद्धरः ।
 श्रीमल्लैवम्भूपाल एतदुयन्वस्य साधकः ॥ ५२ ॥
- 58B, संसारदुर्गजय ईश्वरभक्तियोगाद्
 भक्तिः सदा श्रवणतो वचसां युतीनाम् ।
 सत्पण्डितादिदम्हो शुभपण्डितौघो
 द्रव्यसृष्टाविरहितो धनवत्ततोऽस्य ॥ ५३ ॥
- 59A, श्रीमल्लैवम्भूपालवैरिणां वीर्यस्य संश्लक्ष्णकारकं त्विदम् ।
 यन्नूनं कुतः शक्यविबोधमूढतामुपैति वीर्येतिपदस्य बुद्धिमत् ॥ ५४ ॥
- 59B, भ्रातृभ्यो यः पिष्टदत्तादशेषाद्
 ग्रामान् स्त्रीयादप्यसौ वीतहृत्प्रः ।
 सोऽयं राजा श्रीमल्लैवम्भनामा
 नान्यक्षौषिपालकर्तव्यकर्मा ॥ ५५ ॥
- 60A, अमुना राज्ञा नूनं साधितमेतत् पुरा यन्त्रम् ।
 निर्विघ्नं कृतकृत्या प्रजा यदस्यास्ति सर्वापि ॥ ५६ ॥
- 60B, यः समस्तपुरुषार्थसाधकः शत्रुसङ्घगुणहृदिबाधकः ।
 स्त्रीयराज्यचरचौरसायकः केवलं हरिगुणाभिगायकः ॥ ५७ ॥
- 61A, प्रनिदिवसमवश्यं दौपदानं विधाय
 क्षितिपतिपतिवर्माभीतिससक्तचेताः ।
 निजगणगणतोत्राशेषभूपालरत्नं
 जयति जयति भूमौ श्रीमल्लैवम्भशक्रः ॥ ५८ ॥
- 61B, संसारसर्पभयतः कथमेष युक्तो
 न स्यादहो भरपतिर्यदि साधितो न ।
 यन्त्रेश्वरोयमथवा कल्याणमृताब्धे-
 र्लक्ष्मीपतेः परिचितः परिपत्तिराजः ॥ ५९ ॥
- 62A, शालेति शल्येति पदार्थवाचकं
 स्ववैरिणां शल्यमिवातिदुःसहः ।
 यदग्निभूतोऽग्निषु तेन च भुवं
 स शत्रुशालोऽग्निमितः प्रभोः सुतः ॥ [६०] ॥
- 63B, प्रथमजनुषि जातः श्रीघनश्यामदेवो
 मयि विहृतिनिराशः साम्प्रतं नैतदेव ।
 उचितमिति तु मत्त्वा पार्वती वीरभद्र-
 क्षितिपतितनयासौच्छ्रीघनश्यामराज्ञी ॥ ६१ ॥
- 64A, घनश्याममङ्गानुपात् पार्वतीतः कुमाराच्च माराद् वरः कोऽप्यपूर्वः ।
 हृष्टपालो मल्लैवर्मः स जातो यतः स्वर्गदेवाद् वरा भूमिदेवाः ॥ ६२ ॥

- Fol. 64B, अरिमर्दननामासौ राजकुमारो द्वितीयो यः ।
सुकुमारकुमारतुला मारतुला चात्र हीनत्वम् ॥ ६३ ॥
- 65A, खाक्षीनामकशैले राजा दलसाक्षिनामाभूत् ।
यस्मिन् सौशसति शृष्वीं नरका रिक्तत्वमायाताः ॥ ६४ ॥
- 65B, दलसाक्षिराजपत्नी भवति [सुभ]द्रा सदा भद्रा ।
अतिवीरकर्मतोऽमुं मत्कार्जुनमिह सती पुनर्जाता ॥ ६५ ॥
- 66A, नरवरदलसाक्षिश्रीक्षितीन्द्रात् सुभद्रा
जनयति जनमध्ये चारुसंगेयकीर्तिः ।
इह मङ्गलवसन्तामिन्दिरा या नरेशं
भजति च कुसपत्नी श्रीमल्लैवम्भूपम् ॥ [६६] ॥
- 66B, अरीषां तु मल्लाः क्षणा[द्]ध्वस्तगर्वा
मल्लैवम्भूमिपतेस्तेन शङ्के ।
पुरा जन्मजीदं महायन्त्रमुच्चैः
समाराधितं स्यादिति स्वीयबुद्ध्या ॥ ६७ ॥
- 67A, श्रीमल्लैवम्भूपाल उक्तम्
यन्त्रं लिदं साधितवान् पुरैव ।
यदुवैरिभूमौश्वरसत्प्रतापो-
ऽनल्पानल[ः] क्षम्भिततामवापितः ॥ ६८ ॥
- 67B, श्रीमन्[म]ल्लैवम्भूपालः साधकोऽमुष्य वर्तते ।
कुलदृष्टिस्त्वितरथा कथं स्यादिति दुर्लभा ॥ ६९ ॥
- 68A, नाकपालसदृशारातिपाते न्विप्रवेगमपि वैरिणामेषः ।
कुण्डितां गतिमहो विदधाति क्षापतिर्वरदयन्त्ररुपाभिः ॥ ७० ॥
- 68B, नूनमेष नृपतिः पुरा भवे यन्त्रराजसमुपासकायणीः ।
नो यदीत्यभ[व]दे[मे]व नित्यशो जायतां कथमहो महाजयी ॥ ७१ ॥
- 69A, राज्ञी मङ्गलवसन्ता सशस्त्रशृङ्खीप्रदानायैः ।
सन्तोषितभूमिसुरा भूमिपत्नीप्र[ा]यास्ति भूपस्य ॥ ७२ ॥
- 69B, असुना नरपालस्वरिषा न न संसाधितमसि यन्त्रकम् ।
यद्मौ मनवोऽखिला अपि प्रतिवर्षन्ति समस्तसम्यहः ॥ ७३ ॥
- 70B, श्रीराजराजेश्वरदीपदान-
प्रतापविद्रावितचौरसंघः ।
अनीतिराज्योपि सनीतिराज्यो
नूनं पुरा जन्मनि साधकोऽस्य ॥ ७४ ॥

- Fol. 71A,* श्रीमल्लैवम्मापाल चाले द्युमुष्य यन्त्रस्य तु साधकोऽत्र ।
न चेदमी वैरिण उद्गराः स्युः कुतोऽतिवैकस्यपदं प्रयानाः ॥ ७५ ॥
- 71B, धर्मार्थकाममोक्षा यद्द्वारे भृत्यभावमापन्नाः ।
जयति मल्लैवम्मास्त्रो राजा कल्पद्रुमावेशः ॥ ७६ ॥
- 72B, साधकोऽत्र नरपालनायको गायकः प्रतिपदं रमापतेः ।
कर्मणामखिलकामदायकः मय्यको रिपुकुलक्षये भुवम् ॥ ७७ ॥
- 73B, घनश्यामस्त्रजुर्न मारः कुमारो
• न वा पार्वतीजो मन्त्रादानशूरः ।
न कल्पद्रुमादिः पतिश्च[?]पि लक्ष्म्या
न वा माधवोऽयं द्युपूर्वोऽस्ति राजा ॥ ७८ ॥
- 74A, इह मल्लवसन्ताश्रीमल्लैवम्मादेवा-
वसरनिकरवश्यं यन्त्रमेतद् भजेते ।
न यदि सकलकामा देववश्याः कथं स्युः
करतललतवासा एतयोरप्रय[त्ना]त् ॥ ७९ ॥
- 74B, कामधेनुसुरपादपावुभावेकशोऽपि जगदार्तिनाशको ।
दम्पती तु सुतरामितीव किं तद्युगावतरणं युगं त्वदः ॥ ८० ॥
- 75A, सर्वयन्त्रफलसेवितपादः श्रीरमारमणसुस्मरणोत्कः ।
सर्वभूसुरसमौहितमोदः कोऽपि भूपतिपतिर्जयतीह ॥ ८१ ॥
- 75B, वसति वसितवक्त्रा रोषकाले च बह्ना
शयनजुषि तु सुप्ता स्त्रीयपत्न्यौ निसर्गात् ।
इतिष्ठतश्तरूपकान्ता एषोऽतिशान्तो
मनुरपर इहास्ते श्रीमल्लैवम्मानामा ॥ ८२ ॥
- 76A, राज्ञो मल्लवसन्ता राज्ञो रूपानुसारेण ।
अवतीर्षा शतरूपा प्रियव्रतादिशुभपुत्रकाधाना ॥ ८३ ॥
- 76B, यन्त्रस्योपासको य[?] क्षितिपतिर्लोकः श्रीमल्लैवम्माभूपः
काश्यां मेघं सुसौधं प्रतिशरदशनाद्यर्थकं चापि रायम् ।
मन्त्रादर्शस्य कर्त्रे खगुर्वकवण्या प्रेमनिध्याकयाथ
अद्वाभिर्यो ददाति प्रथिभवतुतमामेष पूर्वाखिलार्थः ॥ ८४ ॥

Philosophy of Rural Reconstruction in China.¹

By JOHN B. GRANT.

THREE MAJOR DESIGNATIONS OF ADDRESS.

Reconstruction in its broader aspect arises from the impact of Science upon Society and the necessity for social reorganization from paleotechnique empiricism to neotechnique experimentalism followed by orderly social control. The narrower aspect is in the sense of overtaking the lag between the twentieth century science and its immediate utilization for human welfare in unindustrialized agricultural society. This latter is the topic under discussion.

Rural reconstruction in China may best be made comprehensible by summarizing the major differences between it and reconstruction in India. Chinese organization is the result of three factors that must be explained to understand the differences. First is the 20 years of field experience and lessons learned. Second is the extension into the communities of the research and training interests of certain leading Chinese universities to develop the methodology of successful reconstruction and to train in these methods the senior staff requisite for administration. Third, the policy of reconstruction, particularly of the universities in question, is based upon defined principles whose acceptance must constitute the point of departure in planning for reconstruction if it is to be either significant or successful. This address discusses reconstruction under the three major designations referred to of experience gained, university participation, and the underlying principles now accepted.

HISTORY.

Rural reconstruction in China developed in the years between the end of the Great War and 1937. This period had two chapters—the first of empirical hit-and-miss methodology lasting till 1934 and the second, a period of systematic planned reconstruction based upon enunciated principles. The earlier period had a number of separate efforts very similar and corresponding to those observable regionally in India today. It is unnecessary to report the majority of these on account of their non-reproductiveness and consequent insignificance in determining

¹ An address delivered before the Royal Asiatic Society of Bengal—March 7, 1941.

the main course of evolution. The main movement centres around a single individual J. Y. C. Yen.

Mr. Yen proceeded immediately upon graduation in the Yale University to the Chinese Labour Corps in France during the war as a Y.M.C.A. secretary. His imagination was aroused by the almost complete illiteracy of the several lakhs of his countrymen recruited chiefly from Shantung province and this resulted in his initial efforts in adult education through evolving a basic vocabulary. This war interest led upon his return to China to the establishment in 1921 of the National Association of the Mass Education Movement; and, the circumstances were such that the movement became nation-wide within a short space of three or four years, particularly in urban areas. During this period the movement enlisted the co-operation of scholars to determine the most efficient basic vocabulary of 1,000 Chinese words that could be learnt by the young-adult in a series of lessons covering three months. The beginnings also were made of the requisite literature to implement the basic vocabulary. And, during this period several provinces were stimulated to establish departments of mass education. The predominantly rural character of China directed Mr. Yen's attention towards the agricultural population. Professors of agriculture, mostly trained abroad, were enlisted to prepare the requisite follow-up literature. However, it was found that the material was so far removed from the realities of the problems of the farmer as to be almost useless in interesting him. This led the Association to establish a rural branch in Tingsien about 100 miles south of Peking, where a few agriculturists settled down to determine through experience what were the real agricultural problems of North China. Mr. Yen was soon forced to the conclusion that no single social field of application of knowledge could progress very far in so backward a community without the concurrent establishment of other fields. He consequently turned for help to the respective university experts in and around Peking, which still was the capital as well as the educational centre of the country. It was this realization of the necessity for a co-ordinated solution of the problem and the manner whereby Mr. Yen was able to enlist the interest and enthusiasm of academic experts which laid the foundation for the planned reconstruction that evolved during the next decade.

It was during this decade after 1925 that 'reconstruction' methodology was experimentally developed in Tingsien in education, agriculture, public health, etc., based on the economic practicability and social conditions of North China. Both the National and the Provincial Governments gave official status to the Association's work in Tingsien, originally established for mass education, whereby the Association was given control of the Local Government through its ability to nominate the Magistrate of the subdivision having approximately four lakhs of

population. In the meantime, Mr. Yen solicited funds for support of the work from private channels in China and returned from a trip to the United States with contributions of (£100,000) five lakhs of dollars to support the veritable social laboratory, utilizing more than 100 technical workers which had gradually been established. The success of Mr. Yen prematurely attracted hundreds of officials and others from all parts of China to an extent that the railway authorities had to make special provision for the number of visitors who also seriously hampered routine activities. This prematurity of interest was dangerous through the discredit resulting from efforts made by many upon their return to their own localities to reduplicate what they had observed in Tingsien without having grasped the technical implications and, more important, lacking the trained technical personnel to undertake reconstruction.

The singlemost important result from Tingsien probably was the manner in which certain universities in and around Peking were stimulated to extend the responsibility and scope of their social disciplines beyond their academic walls into the community. This resulted in the appreciation that the social sciences, as much as the natural sciences, are not taught to but must be learnt by the students through opportunity for self-participation in community exemplifications of the principles presented in the classroom. Consequently, undergraduate students were sent to Tingsien under their instructors. Thus, in medicine the fourth year students had three weeks' rural, added to their previous urban, 'clerkship' in public health, during which time opportunity was afforded for some participative experience in addition to general orientation in rural reconstruction as a whole through demonstrations provided in each field. This development of university interest coincided with the growing national demand for reconstruction that experience proved could be successful only if based upon effective methodology and personnel trained in such methodology. The natural outcome of this university interest was the establishment of a formal organization in 1936 designated the North China Council for Rural Reconstruction, consisting of five universities, the Mass Education Movement, and the Shantung Provincial Government. The purpose of the Council was stated to be 'a correlated community programme of rural reconstruction through which controlled field facilities and services for applied training and research in the social sciences may be made available to its constituent institutions and to provide personnel of high quality to the various enterprises for social reconstruction in China which now are in so great need of trained workers'. The Council functioned through a Rural Institute which carried on instruction and research in the applied social sciences of civil administration, economics, social medicine, education, agriculture, and engineering. The Council was given political control by

Government of the first administrative area of Shantung province possessing approximately ten million population. The Institute as the joint representative of the Council, universities, and the Government possessed the authority to operate the constituted community facilities through power to nominate its personnel to the official Government posts of the area. The universities' departments as such lost their individual identity in the field and functioned solely through the Institute as their co-ordinating agency. Faculty members resided in the field. Within this area the Council through its Institute designated one subdivision of five lakhs of population as its intensive experimental-demonstration field. The Institute consisted of two divisions—the community service division responsible for the routine administration of the area, composed of the heads of instructional departments together with the chiefs of the sections or bureau of Government, whereby teachers from the universities were concurrently appointed as Government officers. The educational-research division was composed of the heads of departments of instruction, and it was this second division which dealt with all matters relating to the educational and scientific policy of the Institute and whereby its representatives on the community service division was able to control and modify governmental administration in terms of its educational and scientific needs. Planning was done in the first instance by the Institute for subsequent approval by the Council and finally by the Provincial Government. The annual budget of the Institute, apart from routine civil administration expenses, was approximately four lakhs of Chinese dollars.

The Council and its Institute were interlinked by means of either its Council or Institute representatives serving on various boards and committees of National Government and advising the latter's policy on the one hand, while Government in turn was represented on the Council and was able to guide Institute policy in terms of the realities of governmental administration. A Rural Reconstruction Committee of the National Economic Council of the Government was established at Nanking to co-ordinate the different fields of government and corresponding to these represented in the Council's Institute.

The colleges of the participating universities drew up syllabi for their departments to take advantage of such a controlled community and requiring the residence in the field for several months of the undergraduate during the last year of instruction. Students were given a brief horizontal introduction to the several co-ordinated fields of social function before 'clerking' vertically in their specific subject. Special facilities were also designed to permit of a limited number of graduate students in each of the social fields. However, any international consideration of China requires the bearing in mind of certain facts relating to the time when a modern Government was established.

Although the Revolution took place in 1911, it was 1927 before the Nanking Government inaugurated civil administration in the modern sense. The chief cause for the non-implementation of the 1911 Revolution was the absence of technical personnel. The first Government university was established as late as 1905, the first permanent Government medical college in 1912 and other technical colleges even later. Consequently for successful rural reconstruction next to solving the problem of proven methodology, it was considered necessary to establish provincial institutes of public administration to provide personnel of a vocational level. It was to train the teachers for the latter that the University Council Institute set as its instructional task because it was obvious that reconstruction would continue in name only until provided with modern social servants competent to initiate and to supervise the utilization of modern knowledge in the daily lives of the people. Also by 1937, reconstruction in China had reached a stage where an acute problem had arisen to protect the movement from being discredited through unsuccessful results of hurriedly created provincial bureaux lacking the essentials here described, particularly methodology and personnel. At this point it becomes necessary, in order to interpret the Council in its true perspective to comprehend both the background of sociological thought common to the constituent members of the Council, as well as the general social-economic level of rural China. The following representation of the philosophy must be understood as one's own recollection of the numerous references which were in circulation between the various senior members of the Council and the innumerable hours of evening discussions that occurred in the quiet rural atmosphere of originally Tingsien, and later Tsining, the seat of the Institute in Shantung.

PHILOSOPHY AND ECONOMIC LEVEL.

Historians and scientists agree that society is in a major transitional epoch corresponding in its revolutionary character to the two major ones previously experienced by mankind, viz. the period of the preliterate culture to the dawn of history when society was founded and the ancient civilizations were established. This second period continued until the present transformation of society began 300 years ago with the European renaissance. Social reconstruction to be intelligent or rational implies planning. Planning is obviously inadequate unless designed in relation to the eventual social scheme as a whole. The trend of the present transitional period of social organization can be defined only in terms of the past and knowledge of differences in the present resulting from new factors which have arisen. Social thinkers previous to the present century expressed ideas on society which increasingly are now becoming accepted

fact. Thus Rousseau¹ defines the Social Contract of Society as : 'That form of association which will defend and protect with the whole common force the person and goods of each associate; and in which each, while uniting himself with all, may still obey himself alone and remain as free as before'. John Stuart Mill² in 'On Liberty' clearly foresaw what is today the world's crisis when he defined the biological basis which social law must evolve towards in respect to individual freedom of liberty: 'Whenever in short there is a definite damage or a definite risk of damage either to an individual or to the public the case is taken out of the province of liberty and placed in that of morality or law'. Herbert Spencer³ in his 'The Data of Ethics' defined the conflict between collective and individual cultures long before the present crisis arose, proving the truth of his diagnosis: 'But here we are met by a fact which forbids us thus to put in the foreground the welfare of citizens, individually considered, and requires us to put in the foreground the welfare of the society as a whole. The life of the social organism must, as an end, rank above the lives of its units. These two ends are not harmonious at the onset; and, though the tendency is toward harmonization of them, they are still partially conflicting. As fast as the social state establishes itself, the preservation of the society becomes a means of preserving its units. Living together arose because, on the average, it proved more advantageous to each than living apart; and this implies that maintenance of combination is maintenance of the conditions to more satisfactory living than the combined persons would otherwise have. Hence, social self-preservation becomes a proximate aim taking precedence of the ultimate aim, individual self-preservation. This subordination of personal to social welfare is, however, contingent; it depends on the presence of antagonistic societies. So long as the existence of a community is endangered by the actions of communities around, it must remain true that the interests of individuals must be sacrificed to the interests of the community, as far as is needful for the community's salvation. But if this is manifest, it is, by implication, manifest, that when social antagonisms cease, this need for sacrifice of private claims to public claims ceases also; or rather, there cease to be any public claims at variance with private claims. All along, furtherance of the individual lives has been the ultimate end; if this ultimate end has been postponed to the proximate end of preserving the community's life, it has been so only because this proximate end was instrumental to the ultimate end. When the aggregate is no longer in danger, the final object of pursuit, the welfare of the units, no longer needing to be postponed, becomes the immediate object of pursuit'.

¹ Jean Jacques Rousseau, 'The Social Contract and Discourses', p. 14.

² John Stuart Mill, 'On Liberty', p. 48, 1913.

³ Herbert Spencer, 'The Data of Ethics', pp. 133-134, 1879.

Today, it is universally acknowledged that the determining force which shapes society is Economics. The essential factor determining Economics is 'Energy'. Machine energy is synonymous with the Industrial Revolution has been clearly analyzed by Stuart Chase in 'Technocracy: An Interpretation'. Chase advances the conception of energy magnitudes being the condition governing political and social institutions. The present emerging third stage was preceded by two earlier stages. Primitive communities had worked primarily by virtue only of the food eaten by their members converted into physical power of human muscle. The chief engine was the human being and his available energy determined the standard of living of the community and its social institutions. This power of the human engine is measurable by its food intake and is equivalent to 2,000 kilogram calories *per capita* per day and this was the sole energy during the first period of man. The second period originated with the early civilizations when the domestication of animals and crude water power was added to man's energy, thereby doubling the magnitude to 4,000 kilogram calories *per capita* per day. This second period extended for approximately 7,000 years until the invention of the steam engine in 1775. Since that time the machine age, developed with the utilization of coal, electricity, and oil, has stepped up capacity in such a country as the United States to 160,000 kilogram calories *per capita* per day.

It is the lag of eighteenth century economic and political institutions behind this twentieth century power that has become the basic world problem. Reconstruction to overtake this lag in the application of scientific knowledge to human welfare is confronted by two problems: the material one of the lag itself and the larger social one of instituting the necessary collectivism while safeguarding the maximum degree of individual freedom commensurate with the welfare of the group as a whole.

Social reconstruction to be successful requires technical knowledge and the most efficient form of organization for the application of that knowledge. It is axiomatic that the form of administration is determined by political organization and that in turn derives from the *per capita* energy production of the country and the economic philosophy. The organization in democracies has been determined by capitalism. Capitalism as a system was first defined after the beginning of the Industrial Revolution and then passed through the three periods of Industrial, Monopoly, and Finance Capitalism, corresponding roughly to stages in the progress of science particularly with reference to its development of power and transportation, because these two are the new major factors.

Industrial capitalism resulted in the form of social administration designated as democracy but has never attained to the substance. The latter is defined as 'the form of government which asserts the worth and validity of the individual

man and that the aim of society is to secure to him the maximum of responsible freedom'. This definition means that society itself must consciously and responsibly aim at social justice which will ensure the closest possible approximation to equality of opportunity for each member to lead the 'good life'. Consideration of rural reconstruction in the restricted sense of this paper implies the enumeration of the unsocial biological results that have arisen in older industrialized countries and which planning should aim to avoid in countries now becoming industrialized. Such an enumeration includes the problems of population, human migration, race, health, urbanization, rural economic crises, cultural lag, social pathology, including diversification of social classes and groups, and poverty. No successful scheme of rural reconstruction can be formulated without knowledge of, and conscious consideration to obviate, these problems that inevitably follow in the wake of uncontrolled industrialization, economic development, and unplanned democratization. It is not, however, within the scope of this paper to go beyond the hope that officials submitting plans of reconstruction designed to overtake social-economic lag in rural communities possess the knowledge of, and have given the necessary consideration to, the foregoing pre-requisites of historical perspective. Major economic factors arising from scientific progress and their resultant problems when uncontrolled must constitute the background of any thinking, if reconstruction is to claim planned technical competency and is to prove successful.

In addition, the administrator must have the equally necessary knowledge of and consideration for the social fields in which application has to be made. Society in the course of evolution has gradually differentiated, or is in process of differentiating, certain major functions listed below:—

1. Education.
2. Protection of Life, Property, and Natural Resources.
3. Production of Goods and Services. Distribution of the Returns of Production.
4. Consumption of Goods and Services.
5. Communication and Transportation.
6. Recreational Use of Leisure.
7. Expression of Religious Impulses.
8. Expression of Aesthetic Impulses.
9. Integration of the Individual (Service to Society).
10. Extension of Freedom (Political Education).
11. Extension of Knowledge and Adaptation to Invention.

The first seven have been clearly differentiated while the last four are sufficiently recognizable to be thus classified. Certain of these major functions in turn have become so well established that they now have developed subdivisions which are themselves autonomous social administrations, as, for

instance, Public Health under Protection, and Industry or Agriculture under Production, etc. Consequently, individuals responsible for planning reconstruction in the sense of overtaking the lag in utilization of knowledge should presumably possess technical information of the extent the organization and administration of each has developed in progressive countries, particularly with respect to their latest trends in order that their experience is available to obviate introduction of wrong methods of organization and administration in the backward community under consideration. Furthermore, the complexity and vastness of modern social-economic organization implies that the social architects in charge of reconstruction must possess comparable knowledge of *principles* requisite for successful organization and administration of each technical field for which establishment is being undertaken; and, without which the structure planned for is as much doomed to collapse as would be the building of a skyscraper or ocean liner by architects proceeding merely along the lines of neolithic rural-cum-empirical knowledge. An example may be taken from the field of public health.

Public health is organized community effort to provide individuals of the community with the greatest degree of utilization of medical knowledge for the three objectives of maintenance of health, the prevention of diseases, and the cure of disease. The organization to attain these objectives effectively together constitute public health administration. Experience has postulated that efficient administration is proportionate to adherence of the following six principles:—

- (i) The necessity for the administration of the different health functions being undertaken for the whole community by a single governing body and not for different sections of the community by several governing agencies, with necessary co-ordination between inter-related sections; in other words, there should be 'centralized direction and decentralized activity'. The administration must provide for technical supervision and periodic appraisal of the efficiency of the organization.
- (ii) Successful administrative procedure results only from scientific investigation and demonstration of organizational methodology in the measures whereby knowledge can be applied in practice to groups of population. The proper training of the necessary personnel in applying the methodology is an important requirement.
- (iii) Successful administrative procedure must be based upon sound financial considerations and practicable economic budgetting suited to the area and the population. Where cash purchase of health reform

is difficult, the available cash may be utilized for technical guidance and supervision and the citizens may offer trained voluntary labour (= payment in kind), which is the largest item in cash purchase of medical protection.

- (iv) Successful community utilization of knowledge for public health reform and medical protection requires a certain level of politico-economic progress and education. Health of the people is eventually achieved through the people being themselves possessed of adequate education in, and practice of, health knowledge.
- (v) The securing of co-ordination between the related spheres of social services, owing to their mutual interdependence.
- (vi) In order to ensure better working and to avoid mistakes in local effort, *the whole design* of a public health planning must be before the mind from the beginning. Any effort, however small and localized, can confer benefit, if it is designed in relation to the scheme as a whole.

These principles may aptly be termed the normal functions of that organ of society designated public health, and dis-functioning of any one or more must produce social pathology resulting in the symptomology of increased morbidity and excess mortality. The second is the one most observably violated in Bengal, where, for instance, the specific mortality for the past decade from such an entirely controllable a disease as smallpox has been 43 per 100,000 as compared with 0.07 and 0.02 for the Philippines and Java, which formerly had the same high rate as Bengal. Consequently, it behoves that reconstruction relating to medical protection to be successful must be planned in terms of these principles rather than be undertaken empirically and so be doomed to inadequate and disappointing results. Similar competency to plan in terms of principles for *each* social field must be the qualification of any director of reconstruction, who is in this respect comparable to the chief of a general staff who would not presume for an instant to undertake, himself, the planning or the operation in any single field but solely discharges the function of co-ordinating into a whole scheme the technical principles and resultant details from the several differentiated technical fields.

It has been stated, apart from the immediate problem of overtaking the social lag in as backward a community as China, i.e. catching up on the present, that immediate planning had to be undertaken in terms of larger world trends, i.e. in terms of the future, to obviate the necessity later on for reconstructing the organization then being established. The principles govern-

ing and determining the whole eventual social design were not new. For instance, one of the major social results of technological developments since the middle of the nineteenth century was the bringing into prominence of classes who formerly were largely voiceless. 'Democratization of society' ran parallel with the ever-growing interdependence of individual activities upon one another to constitute a large whole of efficient social function. Technological advances transformed individualistic into a herd society, in which individual competition was replaced by group co-operation. The resultant subordination of the individual was compensated by the improved economic and cultural levels necessarily obtainable only through group action and therefore planning. The impact of science and industrialization upon *laissez-faire* agricultural civilizations increasingly created individual insecurities, thereby resulting in herd impulses towards salvation by organized security. This produced expediency palliatives through various forms of social welfare and new deals inaugurated especially during the past half a century. One of the results is the transition from recording history in terms of the past to the development of a sociology attempting to shape history out of the emergent forces of the social process now going on and so avoiding the necessity for future palliatives. This recent trend is important as marking the first period when man is collectively setting up goals and organizing himself and society towards scientific attainment of these goals through planning and planned thinking.

Planning requires grasping the complex of events from a number of key positions, from each of which the whole design has to be kept in mind in undertaking individual steps. It is only through this approach that concrete social events previously thought to be accidental can be seen to be the result of principles working throughout the society and that their occurrence can be predicted. Mannheim designates these forces as 'the principia media'; and the importance of understanding these forces for social reconstruction arises from the fact that society cannot be rationalized as a factory, because its complex and various living characteristics if not understood will upset the plan. Consequently, planning is the application of foresight to human affairs, so that social progress increasingly proceeds towards a unity regulated through differentiated knowledge of the major social functions. The problem involved is twofold, because in addition to reorganization of society, there must be the freeing and full development of individual man through a new education. The chain of events constitutes a cycle beginning with Galileo and Copernicus and extending through Arkwright and Watts to the changing ideas about man from Rousseau and Herbert Spencer to the contemporary encyclopaedists. The lag of social techniques must overtake mechanical inventions and technological

improvements. This demands the achievement of a dynamic equilibrium that must solve the problem of security of the group as a whole. This can be accomplished only through adequate social techniques co-ordinated towards a general defined objective. Such planning would produce a rational mastery of the irrational forces of uncontrolled industrialization. The fundamental basis must be education whereby human beings become influenced towards desiring the greatest good of the society as a whole. Numerous educational experiments are being made, especially in the past two decades, directed towards this aim. In turn, social techniques require a new type of personnel for administration which is resulting in the civil servant developing into the social servant. In brief, science and increasing industrialization imposes the necessity for functional rationalization of social organization towards objective ends. A planned economy implies definite social goals to avoid being a contradiction in terms. This requires a planned social strategy to co-ordinate all fields of human endeavour through organizing social action towards the optimum good of the greatest number. The foregoing has been re-postulated and summarized by Mannheim in 'Man and Society' from which much of the summary viewpoints has been borrowed. This review of the sociological thought of the constituent members of the Council may seem unduly lengthy. It, however, must be fully comprehended to understand the underlying philosophy and aims of the Council and of the goal of rural reconstruction. The description in 1910 of a model T Ford in itself might have proved an interesting new phenomenon in transportation but without comprehension of the underlying principle of the internal combustion engine the description could not foretell either the 1940 Mercury or the Spitfire, which a knowledge of the principles of the crude 1910 engine would permit envisaging.

'LAND UTILIZATION IN CHINA', edited by J. Lossing Buck (1937), is a basic study of agricultural and population problems from which further social-economic details are obtained but a summary picture of rural China is as follows. The land under cultivation is twenty-seven per cent. Agricultural development is difficult in consequence of fragmentary holdings. Land-owners consist of forty-four per cent of the agricultural population; twenty-three per cent are part-owners; and thirty-three per cent tenants. The medium size of farm area is 3.3 acres. Taxation varies widely from locality to locality but may be said to be 5.2 Chinese dollars per acre. Illiteracy exists amongst sixty-nine per cent of males and ninety-nine per cent of females. The death rate per 1,000 of population is 27 and the birth rate 38.3. Thirty-nine per cent of farmers are in debt. The *per capita* income for rural areas is 80 Chinese dollars per annum, including the value of all the product supplied by the farm.

SUSPENDED ACTIVITIES.

While the China Incident of 1937 disrupted the Council's work almost at its inception in terms of materialization of the eventual plan conceived along the broad principles enumerated above, it may be of interest to report the immediate specific programme in mind when war was declared. The Council had accepted the three necessary factors in social planning, viz. population, natural resources, and the technical arts, with the objective of correlation of these three factors in terms of the principles referred to. These in turn resulted in the postulation of the three initial problems that must be successfully solved in social application, namely, competent personnel, successful methodology, and the problem of organization including finance. The first two were considered the production aspect of rural social planning while the third was the marketing of what has been produced for the benefit of the community. Thus, the universities constituted the factories of methods and personnel and the Institute field the testing laboratory for marketing. The Council considered that the determining one of the three above factors of social planning was that of power, and that consequently an area whose size and boundaries had been decided entirely by a pre-machine age conditions would not permit the solution of the eventual problem in mind. This problem is internationally similar in nature and has probably been best defined with respect to the Tennessee Valley Authority and described below. When the China Incident arose, the Council was actually in process of proceeding along the following lines to implement its responsibilities of social planning along neo-technical lines.

The Council through the National Economic Council was considering a survey of the natural self-contained power units of the country similar in scope to that undertaken by Roosevelt for the United States and whose report has predicted the eventual redistribution of political boundaries of that country's 48 States in terms of seven natural power provinces. It was expected that the completion of such a survey in China would then permit the North China Council to remove its Institute to one of the eventual units for its development on a planned social-economic basis. There seemed every likelihood that there would be no difficulty in securing the large capital which would have been required to develop the power of that area and that must constitute the starting point of a really planned and largely self-contained community. The war naturally suspended development along these lines.

Any conclusion of possible international value from the efforts towards rural reconstruction in China described above would seem to be the extension of university interests to community problems and recognition of responsibility for its colleges

in the social fields to undertake research in determining methods for the efficient utilization of knowledge for the betterment of human welfare and training in these methods. In this connection it is of interest to note the trend of thought in the United States in connection with the experience of the Tennessee Valley Authority already referred to. This experiment is probably the single greatest effort outside of the totalitarian States to develop co-ordination between control of national resources and their more efficient utilization for human welfare through the social organization of society; embracing as it does an area covering part or all of seven States with a population of ten million. The present Director of the Authority, Dr. Morgan, has postulated (1938) that, 'Unless the appropriate fields of universities can be brought into a more realistic relationship with the problems of our democracy, there will be no basis for assurance as to the future. For if this is not done, there is little reason to believe that the basic conflict of ideals in our capitalistic democracy can be resolved sufficiently to preserve public confidence in democratic institutions as a way of life'.

Dr. Morgan's reason for his conclusions was derived from the experience of the Authority which resolved the multiplicity of local reconstruction problems under four heads:

1. Land.
2. Economic.
3. Social.
4. Political or Governmental.

Thus, under 'Land' are included conservation and utilization of natural resources, the problems of flood control, soil poverty, farm tenancy as well as the conflict between agriculture as a way of living and agriculture as a commercial or industrial undertaking, in addition to the problem of agricultural surpluses. 'Economic' includes the effects of local, national, and international markets on problems of plant food supply, the imbalance of population with the centralization of industry, etc. The 'Social' problem includes housing, collective bargaining, technology and unemployment, farm tenancy, etc. The 'Political' problems raise the questions as to whether governmental units should be based upon political or economic considerations; how to make legislation responsive to public needs; the whole subject of taxation, etc. Analysis of any single major problem revealed its inter-relationship to others of equal magnitude. Analysis of the etiology and the previous effort at solution of these problems indicated their hitherto unrelated channels and consequent failure of solution, thereby perpetuating the fallacious public notion that our evils are unrelated to their causes. The inter-association of the various phases and relationships of these problems are summarized in the analysis in the appendix.

The approach to solve these problems revealed three great needs that had to be met and which revealed that the single greatest problem should be Education, viz. the university, because these three needs proved to be personnel trained in reconstruction, a better informed public understanding of what a successful programme involved, and technical and scientific research capable of being related and translated into solutions of regional and national problems. This extended social responsibility, scope of universities implied not only research into the problems listed, but a *translation programme* whereby a system of education should be developed in order that courses of study should include exercises, laboratory and field demonstrations, in the social-economic problems of today, adequate to accommodate instruction from Kindergarten to Graduate and Adult Education. The problems in the more economically backward China led to the same general conclusions.

It may be of interest to conclude by summarizing some of the interesting war developments of the Council groups following the necessary flight of its Institute from Shantung to Kweichow and later to Szechuen.

WAR DEVELOPMENTS.

There is not time to give the credit due to the indomitable spirit of the faculties and students of the numerous institutions which had to flee into Free China, often after overland marches of over a thousand miles on foot. The chief effect on the Council was that the geographical separation of universities from the Institute precluded the latter from continuing its university functions. The Institute staff remained largely intact and it was reconstituted in 1938 in the Tingfan subdivision of Kweichow province as a vocational training institute to serve provincial reconstruction needs. In the meantime, the Mass Education Association had removed its headquarters from Hopei to Hunan province, where it was given the responsibility by the National Government of organizing a provincial public-administration training institute of a vocational nature for a complete war reorganization of the administration of the province, which was expected to be the front-line after the fall of Hankow. Developments forced the evacuation of the movement to Szechuen province. Here, in early 1940 the movement under Mr. Yen in collaboration with the Council Institute established a National College for Rural Reconstruction. This is in effect an institute for training of three categories of personnel in public administration, which was made possible by the removal of the Institute's resources from Kweichow to Szechuen. The newly constituted college was provided with Tachu, the tenth prefectural area of the province, as its community field and immediately inaugurated post-entry training of two types: an A type for senior adminis-

trators consisting of mature men, many of whom had received their training abroad and had held administrative posts in China. The second, B type, was for young graduates to constitute junior personnel. In addition, it is expected that opportunity would afford in 1941 for reaffiliation with universities who had located themselves in the province, in order to renew undergraduate training. The reconstituted institute, in its training-research programme, retains the six departments which were established in Shantung. Its non-routine-administration budget, however, has had to be reduced to approximately Rs.2½ lakhs per annum.

One of the most significant war reconstruction developments of the Government has been Industrial Co-operation. China's modern industry had become established only near the treaty ports and this was the area occupied by the Japanese within the first 12 months of the China Incident. Free China could only remain free provided in addition to war supplies she could assure a minimum of essential consumer goods. Circumstances of transport and of particularly finance would have made import almost prohibitive. Fortunately the imagination and foresight of a half a dozen private individuals were able to bring together the two essentials required for the establishment of industrial co-operation, namely, tools and trained workers. A significant quantity of the former were evacuated to the interior from the coast by Herculean effort. There were hundreds of mechanics of various categories among the thousands of refugees and these were registered and assigned to specific functions. Initially the movement got under way through private funds collected by the small handful of enthusiasts whose demonstration was sufficient to 'prime the pump' in obtaining Government support. In less than three years, some 1,700 societies with 23,000 members have become established with a monthly production of eight million Chinese dollars. The dependants of these members number 200,000. The products come under ten main categories and are meeting an important part of the nation's military and industrial needs. It is expected that the eventual establishment of 30,000 of these co-operatives will provide an economic base which would make China relatively independent of most of the essential items hitherto imported.

Many of these industrial co-operatives have formed also supply and marketing departments. The movement has been fortunate to enlist foreign expert advice on technical matters and some degree of research. These emergency societies will undoubtedly lead to a future national federation after the war. Groups of them have already formed Unions, the various departments of which are linking up with Farmers' Societies for the purchase of raw materials, and it is hoped that this will result in the permanent establishment of numerous Consumers' Societies, and bring about the completion of the co-operative circle, with

the pre-war credit and marketing societies. Another ancillary activity, although possibly as significant as the establishment of industrial co-operation itself is its development of education. The Chinese co-operative law decrees that five per cent of the profits must be utilized for a common good fund. The industrial co-operatives are providing ten per cent for schemes of education and welfare. This education is remarkable in that it emphasizes manual skill and science as well as literary and social activities in the group. There has been an additional problem to solve in meeting the necessity, particularly under the war-time conditions, to train staff for the rapidly expanding industrial co-operation movement and which has been initiated under almost insuperable difficulties in seven regional institutes, where organized courses for 10-12 weeks are given as preliminary to 'post-entry' training in the co-operatives themselves.

DIFFERENCES BETWEEN CHINA AND INDIA.

Rural reconstruction to overcome the lag between Medievalism and the utilization of modern knowledge cannot be successful if dependent entirely upon cash purchase. The latter on account of low economic conditions and inadequate purchasing power must be limited largely to providing the training of self-help workers and their supervision together with necessary additional technical functions which cannot be provided through voluntary effort. The recognition of this principle came early in the Chinese experience as it has here also in India. But in China there are two fundamental differences—that supervision through cash purchase is functional and specific rather than general and non-specific as in India and that training of voluntary workers is chiefly through drills while lectures are limited entirely to demonstration as the reconstruction worker can be trained successfully only by action and never through talk. The former difference requires amplification. The specific problem of reconstruction is postulated as follows: Knowledge of better seeds, of improved animal husbandry, of successful methods of co-operation, of control of causes of excess mortality due to gastro-intestinal disease, malaria, smallpox, etc., is available, but the problem is development of methods which will bring the knowledge within the practice of the individual villager. It would seem that the trend in India, referring to Bengal particularly, is to select trainees from groups of villagers in each *thana* who will each be provided with a smattering of knowledge in all fields during the period of a few weeks in camp and upon return to their respective villages will be responsible for initiating new practices in these fields into the daily lives of the villagers. Supervision of these peripheral and voluntary workers comes through the Circle Officer, who possibly may contact each trainee once a month or at longer intervals. This

Circle Officer himself is a general administrator, who has not had technical training in any specific field. Consequently, while possessing an intelligent realization of the problems involved he must refer technical matters for solution to the duly constituted authority somewhere between him and the Divisional Centre with all the delays attendant in India upon instituting a new file and securing action. However, the most serious defect is the absence of proved methodology in which the trainee can be drilled. This methodology for the purpose in view must be one that under technical supervision has been shown to be practicable of undertaking by voluntary 'self-help' effort. It is insufficient, for instance, to tell the trainee that gastro-intestinal disease is due to soil-pollution and contaminated water to be controlled by sanitary night-soil disposal and safe water. He must, himself, be given repetitive opportunity to dig latrines and wells. And these and other drill measures must have been previously standardized for local conditions.

The Chinese methodology was developed along functional lines as being more effective under rural circumstances. Experience proved that a voluntary village worker with the limitations of his own education and the technical background providable in a brief period could not effectively undertake self-help development in more than one field; and, he could even then do this only if provided with constant technical supervision. The result of experience led to the following unit scheme of organization based upon an area and population that in India would be a subdivision. Administering this is encountered the first 'general' administrator, under whom were functional divisions designed to bring the necessary technical supervision to the voluntary village worker at frequent intervals. In turn, the village workers were designated by each one or two villages (approximately 200-300 families) for training in each major field provided at the subdivisional centre and as stated the training was entirely drill. Supervision and technical services were organized in terms of the particular administrative needs of each field. For instance, the maximum number that could be handled by the unit of the primary health centre was found to be 20,000 population in a radius of 3-5 miles, whereas the primary peripheral units of agriculture and of co-operation were 4-5 times this area and population. There is no time to describe the detailed administration of even one field. But the following summary of the public health may illustrate the principle in question. Self-help in the village was represented by three individuals: the voluntary health worker, the school teacher, and the 'dai'. Each received a period of drill at the secondary subdivisional centre in previously defined standardized routines. The technical staff at each primary health centre consisted of what in India would be designated a Sub-Assistant Surgeon, a Visitor, and a Dresser-compounder. These had received drill

training at a district base. The primary centre personnel discharged their curative functions in the mornings to the patients largely referred from the village health workers and in the afternoons rotated through the 15 or 20 villages to undertake supervisory technical functions chiefly preventive. The primary centre staff returned to the subdivisional secondary centre over the week-ends for 'post-entry' training. In the meantime the 'D.P.H.' type of personnel at the secondary subdivisional centre spent part of the week supervising the primary centres. Similarly, the village workers, as circumstances demanded, attended the primary centres for conferences, and once a year returned to the secondary centre generally during New Year's. The cost of such a health administration was approximately 15 Chinese cents per annum or between 2-3 annas *per capita*, taking the purchasing power of the rupee as equivalent to the Chinese dollar.

The mechanism of rural reconstruction as eventually stabilized was to take the subdivision (hsien) as the unit of operation and to set-up the secondary centre at the subdivisional headquarters. This included technical personnel and facilities for each of the social fields. Mass education was the vehicle through which other reconstruction activities were built around. Experience proved that little value could result from education of adults after the age of 30 years and consequently mass education was limited to adolescents and young-adults. The products of education were constituted into a self-governing village association who selected individual members to be sent to the secondary centres for training in the separate fields and then upon completion of training were made responsible for the extension of activities in that field within the village. As has already been indicated, in each field the voluntary workers were provided with standardized plans which were supervised from the primary technical centre of each administration. It was considered that the initial stage of reconstruction was passed when the village in question had reached the level of constituting its own primary school, the teachers for which, regardless of previous conventional training, were given additional instruction at the Normal School at the secondary centre. Stabilization of reconstruction required the period necessary until the products of these schools could take their place in the community. The pedagogic motive within the school was one whereby the pupils reduplicated various activities of community life in their school syllabus particularly in agriculture, co-operation, health, and civics.

The characteristics consequently of Chinese reconstruction are:—

- (a) Specifically trained voluntary self-help in the villages for each major social function to be reconstructed.

- (b) Weekly supervision of voluntary workers in each field by specialized technical officers.
- (c) Administration organized by specialized function from the secondary subdivisional centre through to primary centres in the villages. The first generalized officer met with was the one administering a subdivision.
- (d) The development of administrative methodology is the responsibility of universities who themselves control large units of population for the purpose of determining practical means of applying basic knowledge for the welfare of the individuals in the community. The university is naturally also responsible for training the senior administrative officers in each major field of application of knowledge. The junior personnel are trained locally at the district base while the village workers receive their training at the subdivisional secondary centre.

The equipment and methodology of activities from the subdivisional base to the village were standardized.

The primary function of reconstruction in China was to initiate and to co-ordinate interested and duly constituted organizations and institutions to the joint solution of social-economic problems of the villages. Reconstruction administration did not include the responsibility either of solving the technical problems, which were considered to be a responsibility of institutions, or of administering activities that was the responsibility of duly constituted technical administrations. This policy seems significantly different on both counts from that developing in India, where reconstruction *qua* reconstruction not only itself attempts to develop the methodology to solve the social-economic problems but is even undertaking administration duplicating duly constituted administration. This policy is wholly untenable and will have to be revised if reconstruction in India is to produce significant results.

This foregoing difference in the two policies of organization and administration in China and India may be summarized as flexible technical judgment versus rule of thumb orthodoxy. There can never be a doubt as to which is the more resultful when it is a question of fixed programme of files and procedures against deeper technical discipline based upon strategy and planning.

REVIEWS OF BOOKS.

STUDIES IN THE PURANIC RECORDS ON HINDU RITES AND CUSTOMS. By R. C. HAZRA, M.A., Ph.D., Lecturer in Sanskrit, University of Dacca. Published by the University of Dacca, Bulletin No. XX, 1940, pp. 367.

This work was approved as a thesis for the Ph.D. degree by the University of Dacca in 1936. In it the author has made a careful study of those chapters of the purāṇas that deal with Hindu rites and customs. His aim is to describe the vicissitudes of Hindu socio-religious life during different historical periods in the past. Dr. Hazra's book is divided into three sections. In the first, the chronology of the relevant puranic chapters has been considered ; in the second, the different stages of development of Hindu religious rites have been discussed and the third section consists of an appendix giving a list of references to puranic texts quoted by the authors of the smṛti books. The preparation of this list must have involved a tremendous amount of labour on the part of the author. These passages form the source material of Dr. Hazra's book. This section will prove to be extremely useful to future scholars working on this or on some allied problem. Dr. Hazra has tried to determine the chronology of the puranic chapters that deal with social order and religious practice by correlating their contents to the various works on smṛti. For the dates of the smṛti works he has generally relied on the findings of Mr. P. V. Kane as described in the latter's *History of Dharmasastra*, Vol. I.

Dr. Hazra deserves the highest praise for the diligent care he has taken in collating the original puranic texts with the quotations found in the smṛtis but it is to be regretted that he has not been able to do full justice to his own material. One naturally expects that a scholar, who deals with topics discussed by the purāṇas should have a fairly accurate conception of the nature of these books. This is a question of fundamental importance. Dr. Hazra's notion of the purāṇas is open to serious criticism. He has failed to recognize the distinction between the purāṇa and the mahāpurāṇa although the topics discussed respectively by these two classes of books have been definitely stated in more than one place by the authors of the purāṇas themselves and are known to Dr. Hazra. These passages will enable any one to see that the purāṇas in their pure form do not exist as separate books at present. They have been merged in the mahāpurāṇas. It is, however, quite easy for anybody interested in the subject to separate the pure puranic portion, by the five well-known characteristics of sarga, pratisarga, vaṁśa,

manvantara and varṁśānucarita, from the other 'materials, viz., descriptions of religious rites, etc., forming the rest of the topics of the mahāpurāṇa. It seems further that the author has no clear notion of the five topics of the purāṇa and the relations they bear to one another. One should know exactly why these five topics are grouped together in the purāṇas before one can confidently assert that he has understood the full value of the puranic material.

The author has uncritically followed the European scholars in translating 'pratisarga' as 're-creation' and 'manvantara' as 'cosmic cycle'. As a matter of fact 'pratisarga' as a topic of the purāṇas means 'dissolution of the creation' and not 're-creation' or 'secondary creation'. The dissolution of the universe has been described in Vāyu, Chapter 102, under the heading 'pratyāhāra'. 'Pratyāhāra' is the same as 'pratisarga' as will be seen from the use of the latter term in the same chapter in slokas, 46, 53, 131, 132, 133 and 135. If the author had taken pains to read the topics considered under 'manvantara' he would have immediately seen that this term is a technical one indicating time scales. The ancient purāṇakāras have described in connection with manvantara the time scales they employed for various purposes and their methods of indicating chronology. In fact it is clearly stated in Vāyu, I. 79, that manvantara deals with the knowledge or information about time. The term manvantara has also been used to denote the period of one manu. There are fourteen manu periods in each 'kalpa' cycle which has been conceived on two scales, viz., 'human' and 'divine'. It is the 'divine' kalpa only that may be called a cosmic cycle.

The author is under the impression that the sources of the five different topics discussed in the purāṇas are to be traced to tales, anecdotes, songs, lores, etc. (see p. 4). In support of this view he has quoted a śloka from the purāṇas. This śloka with slight variants is to be found in Viṣṇu, Vāyu, etc. The Viṣṇu śloka is as follows:—

ākhyānaiś cāpyupākhyānair gāthābhiḥ kalpaśudhibhiḥ
purāṇasamhitām cakre purāṇārthaviśāradah.

—Viṣ., III. 6, 16.

The author has taken this śloka to mean that tales, anecdotes, etc., 'were used by Vyasa in compiling the original purāṇa' (pp. 4, 5). The correct meaning of the śloka is that Vyasa compiled a purāṇasamhitā (a puranic collection and not an original purāṇa) and added to it the material derived from tales, lores, etc., or in other words he converted the purāṇas into a mahāpurāṇa. The third case inflexion in the words 'ākhyānaiḥ', etc., in the śloka does not signify 'by means of' but 'together with' ākhyāna, etc. (see Śrīdharabhāṣya on the śloka). Having failed to distinguish between the true nature of the puranic and that of the non-puranic materials in the mahāpurāṇa it was easy

for the author to assert that 'the present purāṇas have practically turned into smṛti codes' (p. 5). According to the purāṇakāras the puranic material proper was collected not from tales and traditions but from personal observations of reliable persons known as sūtas (Vāyu, I. 31-32, 4. 8, 99. 213; Matsya, 164. 16-18; Brahmāṇḍa, 1. 21). That the purāṇas contain records of past events is to be seen also from Vāyu, I. 201, and Matsya, 53. 71 ślokas.

Besides the five puranic topics the mahāpurāṇas deal with visarga or secondary creation, means of livelihood, the incarnation of God for the purpose of maintaining religious and social order, the manifestations of prakṛti and the supreme Brahma. The descriptions of various religious rites and customs prevalent at different times thus form the legitimate subject-matter of the mahāpurāṇas. The mahāpurāṇas have been classified under three heads according as they give prominence to Brahmā, Viṣṇu or Śiva, not for any sectarian purpose but as specialized records of beliefs and customs with reference to the three aspects of the Godhead. It is certainly true that devotees of particular sects have utilized different mahāpurāṇas for the furtherance of their own faith.

The author is under the impression that the determination of the date of composition of a puranic chapter will enable him to fix the chronology of the socio-religious events discussed in the chapter. The mahāpurāṇas, according to their own statement, have been repeatedly redacted at different periods, and ancient materials have found place in comparatively recent writings. For instance, in the third book, eighth chapter of Viṣṇupurāṇa, Maitreya asks Parāśara a certain socio-religious question. Parāśara replies that in ancient times King Sagara asked this very question of Ourva and that he will repeat Ourva's teachings to Sagara in answer to Maitreya's question. The presumption is that in this chapter an ancient tradition has been preserved, and it will be very hazardous to assert that the date of composition of this chapter denotes the time when the customs described therein were prevalent. Our author has taken no pains to avoid this fallacy. It is unjustifiable to assume, as the author has done, that the descriptions of the Kali age refer especially to the disorganization of the society in the post-Buddhist period. As a matter of fact the original Kali and the Kalki traditions refer to a much earlier period. The puranic Kali age started at the time of Yudhiṣṭhira and according to the Kalkipurāṇa the exploits of Kalki were events of the past. It says Kalki married the daughter of king Bṛhadratha, took king Viśākhayūpa as his ally and killed king Suddhodana and all mlecchas, yavanas and other heretics and restored dharma on this earth. (Kalki, 1. 4. 30; 2. 1. 25; 2. 3. 76; 2. 7. 28.) The names of these kings are to be found in the puranic dynastic lists and they had flourished long before Buddha.

The author believes that the purāṇa texts were written as a whole at some time or other and therefore whatever was added later should be considered as interpolation. Had the author appreciated the true nature of the purāṇas he would have seen that it was the aim of the purāṇakāras as honest recorders of events to keep the purāṇas up to date by the addition of fresh material. In some cases the names of the successive redactors have been mentioned in the purāṇas themselves. Unfortunately the sources that fed the purāṇas dried up some time after the Andhras and the later efforts to keep the purāṇas living were of a sporadic nature. The mention of such comparatively recent events as the reign of Queen Victoria in the *Bhaviṣya Purāṇa* by some unknown redactor is thus quite in keeping with the spirit of the purāṇas. Therefore, the question of chronology of any particular chapter of any purāṇa is to be considered an useful problem only so long as it helps us to find the chronology of the events and customs described therein.

Wherever Dr. Hazra has found a similarity of language in the description of events or a similarity of events themselves in two different purāṇas he has jumped to the conclusion that the one must have borrowed from the other. Dr. Hazra forgets the possibility of a common source, such as a prevalent tradition or the descriptions given by the sūtas from whom the purāṇakāras, according to their own statements, got their materials. Dr. Hazra writes: 'Many myths and legends, which are found in a concise and older form in the *Viṣṇu-p.* appear in the *Bhāgavata* in a much enlarged and elaborate version.... In the *Bhāgavata* there are stories which are not found in the *Viṣṇu*..... From all this it appears that the *Viṣṇu-p.* is older than the *Bhāgavata*' (p. 22). It is needless to point out the logical fallacy that underlies such deductions from negative premises but unfortunately this is a favourite style of argument of the author.

Wherever in any purāṇa Dr. Hazra has been unable to trace a connection between a previous description and an immediately succeeding one he has supposed that interpolations have occurred. I quote a typical example. 'Again, in *Mat.* 50, 68-71 (*Vā.* 99, 260-263; the *Vāyu* differs in readings in several places) the sages, wishing to hear of the future, put to *Sūta* several questions about (1) future kings—their names and the periods of their reigns, and (2) the future ages—their characteristic signs, their merits and defects, and the happiness and miseries of the people during these ages. Consequently *Sūta*, promising to narrate to them the future *Kali* age, the future *Manvantaras* and the future kingships, begins with the future kings and answers all the questions in *Mat.* 50 (verses 77 to the end = *Vā.* 99, 270-280a) and 271-273 (= *Vā.* 99, 281, to the end). About the future *Manvantaras*, which *Sūta* himself wants to narrate nothing is said in the *Matsya-p.* whereas in the *Vāyu* these are dealt

with in the following chapter (i.e. chapter 100). From these disagreements between the two purāṇas it follows that the Matsya-p. borrowed only those chapters from the Vāyu which it found necessary without caring for the lines containing references to other chapters of the Vāyu' (pp. 29-30). In the first place it is not correct to say that Matsya-purāṇa has not dealt with future manvantaras. In Chapter 51 which follows the one containing the sūtas' promise we do find a description of the future manvantaras as promised by the sūta. Then again in Chapter 9 also of the Matsya-purāṇa future manvantaras have been described. Dr. Hazra would have us believe that the interpolators must have been very foolish people as they even failed to efface the lines containing tell-tale references.

In another place the author writes: 'thus the unknown interpolator creates an opportunity for himself to insert some of the chapters of the Kūrma-p. In doing so he has tried to efface the Śaiva stamp which these chapters bear. Thus in a few places the names of Śiva have been replaced conveniently by those of Viṣṇu, while in many other places the names of the god have been retained intact' (p. 111).

It seems that according to our learned author it was not only the interpolators that showed a curious admixture of foolishness and carelessness but also the smṛti authors showed similar traits. He writes: 'The few cases, in which the verses quoted by Hemādri from the Bhaviṣya-p., are found in the Uttara Parvan, must be due to the confusion between the titles "Bhaviṣya" and "Bhaviṣyottara"' (p. 170). According to the author although some of the smṛti writers knew the apocryphal character of the present Brahma-purāṇa still they quoted from it. They were foolish enough to believe in the authoritativeness of the upapurāṇas and to give them the same importance as the mahāpurāṇas as sources of dharma (pp. 146, 151). The attitude, seen in some modern scholars, of considering purāṇakāras and other ancient authors as foolish and careless persons incapable of even simple calculations, indulging in all sorts of exaggerations for the purpose of deceiving people and unable to guard themselves against inconsistencies which even a child would detect, is indeed curious.

In Part II of his book the author, in trying to give a description of the Hindu society and the different stages in the development of puranic rites and customs, has depended generally on non-puranic sources; he has merely reflected the well-known views of the European scholars. The author's wrong ideas of the nature of the purāṇas and his unfamiliarity with the broad principles of the Hindu religion and of the relations existing among the vedas, the smṛtis and the purāṇas, have landed him in a pitfall in many places. European scholars have been familiar with the history of an almost continuous enmity between the Church and the State in their own country and they have

naturally assumed from the record of a few quarrels between a Brāhmaṇa priest and Kṣatriya ruler that in India also there must have been a similar eternal opposition between the Brāhmaṇas and the Kṣatriyas; their personal attitude towards the caste system and towards the supremacy enjoyed by the Brāhmaṇas in certain affairs of life made them readily believe in the anti-thesis, brahminical and non-brahminical, which they have ridden to death. It is a pity that some Indian scholars should allow themselves to be dominated by such views.

The absence of critical insight on the part of the author has resulted in his making contradictory statements at several places. He writes on p. 252, 'From what has been said above it is clear that in the Purāṇas the Brāhmans adopt every possible means to make the people bounteous to themselves. They are not, however, satisfied with this even. They become so greedy for gifts that they call upon the administrative power of the king to force the people to be charitable to themselves in normal times as well as in famines . . . The avaricious character of the gift-seeking Brāhmans seems also to be indicated by the stories of fatal quarrels over the possessions of gifts'. In p. 255, however, the author draws quite a different picture. 'In spite of all their preachings for gifts, the Brāhmans seem never to have ignored the ideal of simplicity and asceticism. They formulate that a Brāhman should live a simple life in which excess of wealth should have no place. He should not be greedy, nor should he be anxious for the acceptance of gifts, because greed of money causes degradation. He should accept from others only the amount which will give him a bare subsistence . . . they are to spend it for the maintenance of their dependents, for the worship of gods, for entertaining guests, for performing sacrifices and for making gifts, but never for enjoyment.'

Inferences, deductions and interpretations are not the author's strong points but the book will be considered valuable for its appendix.

G. BOSE.

THE SANTAL 'INSURRECTION OF 1855-57.—BY KALIKINKAR DATTA, M.A., Ph.D. Published by the University of Calcutta, 1940.

Dr. Datta deserves our thanks for drawing attention to the little known Santal Insurrection. Historians are divided between those who can see a pattern in the sequence of events, and those to whom the pattern remains hidden. This story at least points a moral, that even the humblest subjects of a country are affected by changes in the government. Unlike the Sepoy mutiny, the Santal rising was not in its origin anti-British, nevertheless it was a result of the spread of British power in India. The extension of the reign of law and order gave more security to the propertied classes, and so far as the Santals were concerned, legalised the rapacity of the money lenders into whose clutches they were falling. The administration was inexperienced in the art of protecting special classes of people, and a widespread breakdown of authority resulted. All this has been well brought out by Dr. Datta, who also devotes most of his pages to an account of the outbreak and progress of the insurrection, and the measures taken to suppress it. He has assiduously searched record rooms in Bhagalpur and Dumka, and has also unearthed some contemporary manuscripts in Bengali and Hindi, which portray vividly the hysteria which prevailed in the bazaars of what is now the Santal Parganas in the rainy season of 1855. It is hard to escape a feeling, however, that the actual events of the insurrection, and government measures for suppressing it were of little significance in themselves. The occasional clashes between troops and the hordes of primitively armed rioters (for that is what they were in fact), hardly deserve to be treated seriously as military operations.

We confess to being disappointed with Chapter IV, entitled 'Sequel to the Insurrection'. Not only was the Government convinced of 'the necessity of adopting prompt measures to bring Santali areas under an effective administrative control', but the creation of a non-regulation district led to the possibility of Government regarding itself as the trustee of the Santal, and so setting up a system of administration suited to primitive people. How far this opportunity has been successfully used is another matter and one which we could scarcely expect to find debated in a history of the insurrection. There is not sufficient recognition of the fact that there are very considerable Santal areas outside the area in which the disturbances took place, in which the Santals continued to live for many decades under difficulties which were removed for their brethren in the Santal Parganas as a result of the insurrection. It is not entirely accurate to picture the direction of missionary activity to the aborigines as one of the important results of the insurrection.

The Rev. James Phillips, of Midnapur, had by 1852 published 'An Introduction to the Santali Language'.

The student of Santal culture will be merely tantalized by this book. To take one example, from several that might be chosen, there is the twice repeated reference to the Santals making use of 'poisoned arrows'. What is the authority for this statement, and can it be trusted? So far as the reviewer is aware the art of poisoning the tips of arrows is unknown to the Santals of to-day, nor do they appear to have any tradition of such an accomplishment in the past. Have we here a clue to some little known and hitherto unsuspected trait in Santal culture, or is the statement based on evidence which cannot be (ethnologically) trusted? One could have wished for more treatment of those features of the rising which would throw light on the psychology of primitive mass movements. Perhaps the available records are too meagre to yield much result, but it is a pity that the invaluable narrative of Chotrae Desmañjhi, a Santal, who as a boy of fourteen or fifteen took part in the rising, is apparently unknown to the author. (It is published only in Santali, at the Benagaria Mission Press.)

There are several appendices which considerably enhance the value of the book, and we are grateful too for the useful index.

W. J. CULSHAW.

R̥GVEDA: VOLUME I (AṢṬAKAS 1 AND 2, pp. 10+478). TRANSLATED INTO TELUGU BY SHRI B. MALLAYYA SĀSTRĪ. Published by the Vinayāshram, Guntur Dt., Andhra Desh. Price Rs.2-8.

The long-awaited Telugu translation of R̥gveda has come out for the first time from the nationalistic Vinayashram, one of whose fundamental aims is to publish in Telugu all the sacred books of the Orient.

This volume enables many a layman to have a peep into the ancient culture of Hindusthan. The original text is given with the *svara*, accompanied by a faithful rendering of Sāyaṇa's immortal commentary. Here and there the translation affords some difficulty in *anvaya*, owing to the mixing up of the grammatical and the colloquial dialects, so common with the Sanskrit scholars of Andhra Desh. The language is lucid, despite its archaisms.

Naturally enough, being the first of its lot, a good number of unwanton things have crept into the text, which, we hope, will be remedied in the subsequent volumes. The omission of the *padapāṭha*, even in the first edition, causes much regret to the students of Vedic literature and culture. So far an edition of R̥gveda without *padapāṭha* was considered to be above uncertainty, for it is the latter that makes many a *R̥k* easy of understanding, despite a faithful translation. The complexity of the situation has been enhanced by the improper spacing given throughout. Curiously enough some mistakes have crept even into the text as in 1. 4. 3 अगदि for आगदि, 1. 4. 10 मद्वा नेत्सुपारः for मद्वात्सुपारः, 1. 9. 1 मद्वाँनभिदि for मद्वाँ अभिदि, 1. 10. 5 निदिधे for निषिधे, and so on.

Lack of proper accentuation, as in 1. 12. 9, distinguishes some. When our ancients handed down the text with proper *padapāṭha* and *svara*, from generation to generation with some belief in its sanctity, it would have been better if all errors were avoided at least in the *R̥k* text. We hope these things will be properly taken care of in the subsequent editions.

Anyhow, the text is a valuable addition to the Āndhra Sārasvat, as it serves as an inspiring text for the educationists and the literary people to undertake some more editions of the R̥gveda in the future. In the preface we are promised that the views of the modern interpreters and of some other ancient commentators, together with the Translator's views, will appear in the last volume, which, when it is published, will be a really noteworthy original contribution in the field of Vedic exegetics in Telugu.

P. S. SASTRI.

INSTRUCTIONS TO AUTHORS FOR THE SUBMISSION OF PAPERS FOR PUBLICATION IN THE JOURNAL AND MEMOIRS OF THE SOCIETY.

PAPERS

1. All communications submitted to the Society for publication should be addressed to the General Secretary and not to any officer by name. They should be type-written on one side of the paper with sufficient margin on the sides, and in all respects must be absolutely in their final form for printing.

2. Papers must be accompanied by a brief abstract not exceeding 1,000 words, which shall indicate the subject of the paper and the nature of the advance in the existing knowledge on the subject.

3. Tables of contents (for long papers), references to the plates and literatures, etc., should be given in their proper places.

4. Quotations in Oriental languages should be in the original script, and wherever they are transliterated the System of Transliteration adopted by the Society must be followed (see instruction 15). The names of *genera* and *species* in the case of biological communications should be underlined to indicate that they are to be printed in italics.

ILLUSTRATIONS

5. All drawings and photographic prints should be as clear as possible. They should be in a form immediately suitable for reproduction, preferably of a size to permit reduction to about two-thirds the linear dimensions of the original, and should be capable of reproduction by photographic processes.

6. Drawings and diagrams to be reproduced as line blocks should be made with fixed Indian ink, preferably on fine white Bristol board, free from folds or creases; smooth clean lines or sharp dots, but no washes or colours should be employed for shading. The positions of the illustrations that are to appear in the text must be clearly indicated in the margin of the paper; and explanations of the figures should be typed at the end of the main paper with the indication: *Explanation of text-figures*.

7. The maximum space allowable for illustrations in the *Journal* and the *Memoirs* are as follows:—

Journal, text, 3½" × 6½"; Plates, 4½" × 7".

Memoirs, text, 6¼" × 9"; Plates, 7½" × 9½".

These spaces include the usual figure numbering. Explanations of the plates to be printed on separate pages, facing the plates, must be typed on separate sheets.

PROOFS

8. A proof of each paper will be sent to the author, on the address given on the MS.

9. No alteration or addition necessitating any considerable change of type may be made in the proofs. Should such alterations or additions be necessary, these must be added as footnotes duly dated and initialled. The cost of corrections made in the proofs should not exceed 20% of the printers' charges for the setting of the paper; any excess will be charged to the authors.

10. The proof must, if possible, be returned within one week of the date of receipt to the Society duly corrected.

MISCELLANEOUS

11. Authors of papers published in the Society's *Journal* and *Memoirs* are entitled to receive *gratis* 30 copies of each paper, and as many more as they require on payment of the cost of printing, paper, and make up. Such requirements must be stated at the time of returning the proofs.

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13. No communications under consideration or accepted for the Society's publications may be published elsewhere without the express sanction of the Council.

14. To facilitate the compilation of indexes, each author is requested to return to the Society together with the proof, a brief index of the contents of the paper. These indexes will be edited and incorporated in the volume when completed.

15. The following systems of transliteration are henceforth to be followed (as far as practicable) in the publications of the Society, in quoting non-European words as such. In giving names of places, authors or books, which would occur in the course of the English text, a 'broad' transcription, following English values of the consonants and avoiding diacritical marks, is recommended.

SANSKRIT

अ = a आ = ā इ = i ई = ī उ = u ऊ = ū
 ऋ = ṛ ॠ = ṝ लृ = l̥ ए = e (or ē) ऐ = ai (or ai)
 ओ = o (or ō) औ = au (or au) (Prakrit अर अउ = ai, aū)
 ऽ (Anusvāra) = m̐ ः (Visarga) = h̐ × (Jihvāmūliya) = χ
 ॡ (Upadhmānīya) = φ

Sandhi Vowels may be indicated as â î û ê ô. Avagraha = '.
 Accents in Vedic—Udātta á ā etc. Svarita—à.

क ख ग घ ङ = k kh g gh ṅ (or ṅ)
 च छ ज झ ञ = c ch j jh ñ (or ṇ)
 ट ठ ड ढ ण = ṭ ṭh ḍ ḍh ṇ
 त थ द ध न = t th d dh n
 प फ ब भ म = p ph b bh m
 य र ल व = y r l v (or w)
 श ष स ह = ś ṣ s h
 ङ ञ = ṅ ṇ

HINDI (and other North Indian Speeches)

As for Sanskrit, only nasalised Vowels are to be indicated by a *tilde* mark (˜) above the Vowel (e.g. अँ अॉ अँ अँ = ā ã ī ã).

etc.), and ॠ ॡ are to be denoted optionally by either $d dh$ or by $r rh$. Care should be taken in distinguishing ब and व (b and v)—the latter preferably may be written as w rather than v , specially in intervocal and final positions. The final silent $-a$ may be optionally omitted : but in quoting Early Hindi, etc. the final a should be retained. ळ ञ as in Rajasthani, Panjabi, etc. are to be indicated as in Vedic.

BENGALI

The system, for Sanskrit, with the provision for nasal Vowels and for ॢ ॣ (= ॠ ॡ) as in Hindi. For য (অতঃস্থ য), in all *tatsama* or pure Sanskrit words, y should be employed, in Prakritic and semi-tatsama words, j ; subscribed য (= য-ফলা) should be indicated by y . The difference between বর্ণীয় ব (= b) and অতঃস্থ ব (= v, w) need not be indicated for Bengali— b may be written for both : only subscribed ব (য-ফলা) is to be written as w (e.g. Skt. *Viśvāsa* = Bengali *Biśwās*). Final $-a$ may be omitted optionally, but it should be retained for Early Bengali.

ARABIC

In transcribing Arabic, according to the context either (i) the native Arab pronunciation (as current in the *Jazīratu-l-'Arab*) or (ii) the Perso-Indian pronunciation may be followed.

(i) Arabic in native Arab Pronunciation—

أ (alif hamza) = ' ; ب = b, ت = t, ث = th (or θ) ; ج = j (or g), ح = h, خ = kh (or χ , or x) ; د = d, ذ = dh (or δ) ; ر = r, ز = z ; س = s, ش = sh (or $\mathfrak{š}$) ; ص = s, ض = d ; ط = t (or \mathfrak{t}), ظ = z (or \mathfrak{z}) ; ع = ' , غ = gh (or γ) ; ف = f, ق = q ; ك = k ; ل = l ; م = m ; ن = n ; و = w, ū ; ه = h ; ي = y, ī.

— respectively = a, i, u (or $\mathfrak{ä}$, $\mathfrak{ö}$ optionally in place of i, u), ا = a, i, u ; آ = ā ; إ = ī ; و = ū ; عى = ay (or ai) ; و = aw (or au) ; tanwīn = ^{un, an, in} above line ; ى = ā. (Note: عبد الحق = 'Abdu-l-Haqq, or 'Abd al-Haqq, not 'Abd-ul-Haqq.)

ث = t (or h, or th).

(ii) Arabic in Perso-Indian Pronunciation, in the case of the following letters—

ث = ś, ذ = ź, ص ض = š ž, ط ظ = ṭ ṣ.

PERSIAN

As for Arabic in Perso-Indian Pronunciation, with the following special Persian letters added :

پ = p, چ = ch (or c, or č), ژ = zh (or, ž), گ = g.

و may be indicated for Persian by v rather than w.

For Early Modern Persian, and Indian pronunciation of Persian, the *majhūl* sounds of و and و (= ē, ō) may be employed side by side with the *ma'rūf* sounds (= ī, ū).

و ی = au, ai. Nasalisation (*nūn-i-ghunna*) may be indicated by *tilde* mark (˜) on the top of the Vowel, as in the case of Hindi, etc.

Hā-i-mukhtafī can be represented optionally as ah or a.

The *Izāfat* is to be written as -i- (or -ə- optionally).

URDU

As for Persian, only و = w, rather than v. See also the directions for Hindi. The special Urdu letters in the Perso-Arabic alphabet for Urdu are to be transcribed as in Hindi, e.g. ث = ṭ, ڈ = ḍ, ژ = ṛ (or ṛ).

TAMIL

In transcribing Old Tamil, the modern pronunciation should not be followed—an exact transliteration will be enough for the purpose. This is in case of the consonants, which for Old Tamil should be indicated as below :—

க = k (never g, even medially) ;	ங = ṅ (or ŋ)
ச = c (never ś, or j) ;	ஞ = ñ (or ɲ)
ட = ṭ (never d, even medially) ;	ண = ɳ ;
த = t (never d, or th) ;	ந = n ;
ப = p (never b, or v) ;	ம = m ;
ய ர ல் வ = y, r, l, v ; ன = ṇ ; ன் = n' ; ற = r' (ன்ற = n'r',	
not ndr ; ற்ற = r'r', not tt) ; ட = ṭ (or ḷ) ; ஃ (<i>āytam</i>) = h.	

Long ē and Long ō are to be distinguished from the corresponding short vowels by the *macron* or length mark—the short e and short o being left unmarked.

TIBETAN

Vowels—	a	i	u	e	o
Consonants—	k	kh	g	ñ	(or ŋ)
	c	ch	j	ñ	(or p)
	t	th	d	n	
	'p	ph	b	m	
	ts	tsh	dz	w	
	ž	z	'(or ɣ)		
	y	r	l	š	s h

Silent letters need not be attempted to be indicated in transcription, but if necessary, the modern pronunciation may be denoted by some consistent system of phonetic transcription within brackets after the transliterated Tibetan (or *vice versa*).

CHINESE

Usually the North Mandarin Pronunciation should be represented, in Wade's system, with tones denoted by numerals. As far as necessary or practicable, the original Chinese character and the reconstructed pronunciation of it in Ancient Chinese should be given within brackets.

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**Post-Embryonic Development of the Respiratory System
of *Dialeurodes eugeniae* Maskell (Homoptera,
Aleurodidae) together with Preliminary
Observations regarding the Mechanism
of Respiration in the different Instars.**

By R. RAKSHPAL.

(Communicated by Dr. B. Prashad.)

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INTRODUCTION.

The immature members of the family Aleurodidae lead a peculiar mode of life in that they remain attached to the leaves by their ventral surfaces; they have therefore developed a few peculiar features in their respiratory organs and mechanism of respiration. This paper is an attempt to give a complete account of the post-embryonic development of the respiratory organs of two Aleurodids and to record a few observations on the mechanism of respiration in the various instars.

Although a few workers had previously given brief accounts of the respiratory organs in white-flies, a complete account of the post-embryonic development of the respiratory system of *Dialeurodes dissimilis* Q. & B. was first given by Roonwal (1935). As I have found a number of new structures showing further peculiarities in the development of the respiratory system, I am giving here an account of my observations.

DEVELOPMENT OF THE RESPIRATORY SYSTEM OF *Dialeurodes eugeniae* MASKELL.

1. *Spiracles.*

Number.—In a newly hatched larva, the spiracles cannot be seen, but as the larva grows and becomes a fully developed first instar, the four pairs of spiracles (Text-fig. 1) are easily visible. In the second instar (Text-fig. 2) the first, second, and fourth pairs of spiracles become further developed, but the third pair begins to atrophy, *i.e.*, the spiracular trachea which is open in the first instar begins to close and closes completely by the time the second instar is fully developed. Consequently, in the late second instar or early third instar, only three pairs of spiracles remain. As the third instar grows, a new third pair of spiracles makes its appearance and, in the later stages of the third instar, it becomes as fully developed as the other three pairs. This new third pair of spiracles lies a little posteriorly to the original atrophied pair. Thus in the fully developed third instar the full number of four pairs of spiracles is present, and this number is retained in the fourth instar (Text-fig. 4). This replacement is in conformity with the observations recorded by Roonwal (1935) in *D. dissimilis*.

Position.—In the first instar (Text-fig. 1), the first pair of spiracles is situated on either side of the mouth, a little posteriorly to the first pair of thoracic legs. The second pair of spiracles is situated just posteriorly to the second pair of thoracic legs. The third pair of spiracles lies a little posteriorly to the first abdominal segment. The fourth pair of spiracles is situated in the last abdominal segment on either side of the vasiform orifice, but a little posteriorly to it.

In the second instar (Text-fig. 2) the first pair of spiracles moves a little forward and comes to lie about the middle of the thoracic breathing-fold, *i.e.*, at the base of the first pair of thoracic legs in the prothorax. The second pair of spiracles shifts behind and comes to lie between the last two pairs of thoracic legs, *i.e.*, at the posterior margin of the mesothorax. The third pair of spiracles, though beginning to close, similarly shifts behind and comes to lie a little posteriorly to its original position in the first instar, *i.e.*, on the posterior margin of the first abdominal segment. The position of the new third pair of spiracles can also be made out at this stage and lies about the middle of the third abdominal segment. The fourth pair of spiracles moves a little anteriorly and lies one on each side of the vasiform orifice.

In the third instar (Text-fig. 3) the first pair of spiracles lies more or less at the same place as it does in the second instar, but the second pair of spiracles moves still more posteriorly and comes to lie at the anterior margin of the metathorax. Thus there are no spiracles in the mesothorax. The original third pair of spiracles becomes completely closed, and the place

at which the closing takes place lies about the middle of the second abdominal segment. The new third pair of spiracles which lies about the middle of the third abdominal segment in the second instar, shifts backwards and now comes to lie at the posterior margin of this very segment. The fourth pair of spiracles lies more or less at the same place as it does in the second instar, *i.e.*, on both sides of the vasiform orifice. The fourth pair of spiracles is best developed and is slightly bigger in size than the others.

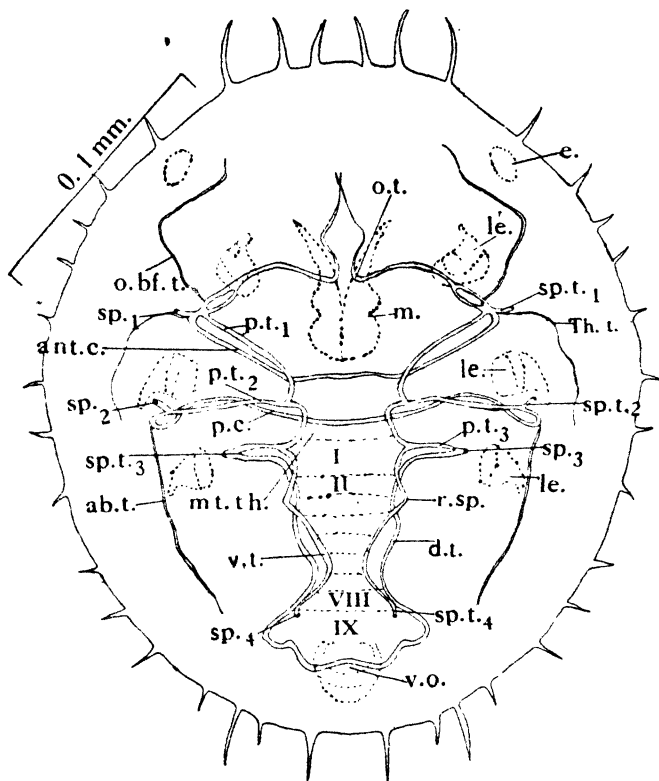


Fig. 1.—The respiratory system of the first instar larva of *D. eugeniae* from the ventral side. *ant.c.*, anterior commissural trachea; *ab.t.*, abdominal trachea; *d.t.*, dorsal trunk; *e.*, eye; *le.*, leg; *m.*, mouth; *me.th.*, mesothorax; *o.bf.t.*, ocular breathing-fold trachea; *o.t.*, oral trachea; *p.c.*, posterior commissural trachea; *p.t.1*, *p.t.2*, *p.t.3*, *p.t.4*, palisade tracheae; *r.sp.*, rudiments of the secondary third spiracle; *sp.1*, *sp.2*, *sp.3*, *sp.4*, spiracles; *sp.t.1*, *sp.t.2*, *sp.t.3*, *sp.t.4*, spiracular tracheae; *Th.t.*, thoracic trachea; *v.o.*, vasiform orifice; *v.t.*, ventral trunk; I to IX, abdominal segments.

In the fourth instar (Text-fig. 4) all the four pairs of spiracles are fully developed. The first pair has moved a little anteriorly and comes to lie near the anterior margin of the prothorax.

The second pair has moved a little posteriorly and comes to lie in the metathorax near its anterior margin. The new third pair of spiracles, which is now as well developed as the other spiracles, has also moved a little posteriorly and comes to lie in the fourth abdominal segment near its anterior margin. The fourth pair of spiracles occupies more or less the same place as it does in the second and the third instars. These details of shifting of spiracles have not been described before.

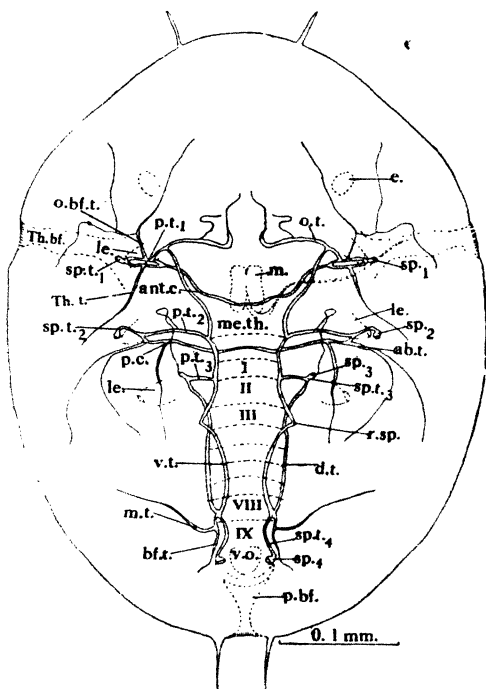


Fig. 2.—The respiratory system of the second instar of *D. eugeniae*, from the ventral side. *bf.t.*, breathing-fold trachea; *m.t.*, mycetomal trachea; *p.bf.*, posterior breathing-fold; *Th.bf.*, thoracic breathing-fold. Other letters as in fig. 1.

Structure.—In the first instar the spiracles just begin to develop, *i.e.*, there is as yet no enlargement of the spiracular tracheae to form any kind of pit or atrium, and therefore the spiracular tracheae open directly to the outside. In the second instar the integument sinks inwards and therefore each spiracular trachea lies at the bottom of the pit-shaped spiracle. In the third instar the spiracles become enlarged although they still remain pit-shaped. In the fourth instar (pupa), the spiracles are fully formed, the largest being the fourth pair. The other

three pairs of spiracles are similar in structure, although sub-equal in size.

Each spiracle of the fourth pair shows a well-developed structure and may be described as a type. It is more or less bell-shaped (Text-fig. 8); the external or atrial opening is oval in outline and is protected by a cuticular rim or *peritreme*. The atrial opening leads into a bell-shaped atrial cavity, which in its turn leads into the spiracular trachea through a small oval opening. Proximally, the spiracle is produced into a solid, cuticular tail-like process which is possibly supportive in function. There seems to be no mechanism for opening and closing the spiracle which is thus of a simple type.

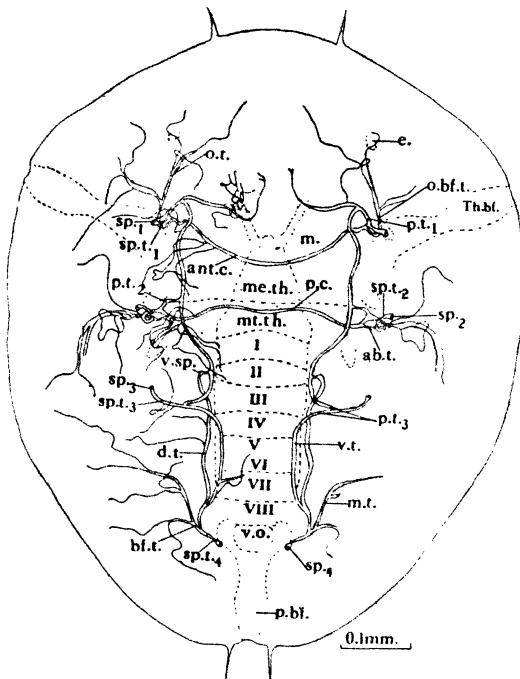


Fig. 3.—The respiratory system of the third instar of *D. eugeniae*, from the ventral side. *v.sp.*, vestiges of the primary third spiracle. Other letters as in figs. 1 and 2.

The development of the spiracles in *D. eugeniae* gives an idea of the evolution of the spiracles. In its simplest form the spiracle (Text-fig. 5) represents a primitive tracheal invagination leading from the integument into the trachea. Spiracles of this kind are found in the first instar of *D. eugeniae*; and form the simplest kind of the open type of spiracle. Later on the primary tracheal aperture becomes slightly sunk so as to lie in a

depression of the integument. The spiracle (Text-fig. 6) thus becomes a pit-shaped chamber, the (atrial) cavity of which opens to the exterior through the atrial orifice, and leads into the trachea by the primitive tracheal orifice. Spiracles of this type are found in the second and the third instars of *D. eugeniae* and represent a more highly developed type than the first. Later on, the atrial orifice becomes protected by a cuticular rim or peritreme (Text-fig. 8), which is found in the pupa. This is a still more highly developed stage. In some cases a further elaboration takes place and a mechanism for opening and closing the spiracle is developed, but this mechanism is not developed in this species.

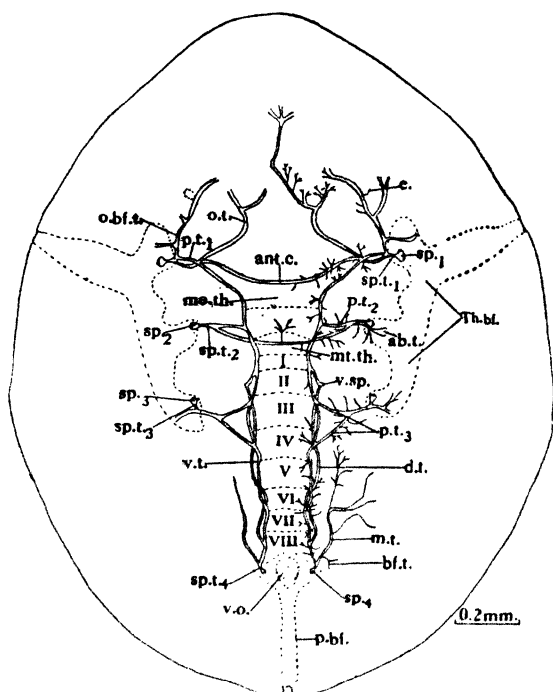


Fig. 4.—The respiratory system of the male pupa of *D. eugeniae*, from the ventral side. Lettering as in figs. 1, 2, and 3.

2. The tracheae and tracheoles.

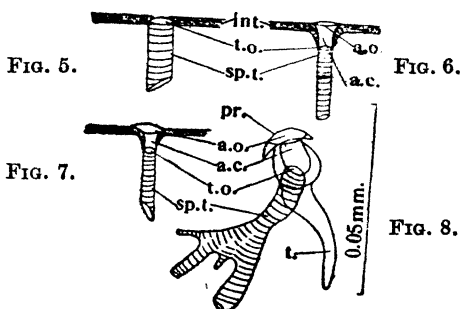
Snodgrass (1935) says, 'As the primary tracheal invaginations grow into the body of the insect, they divide at a short distance from their origin into major and minor branches, and eventually ramify to all the tissues'. In general this statement is true as is shown by a study of the development

of *D. eugeniae* and *Aleurodes* sp., but it is not always so simple, as Roonwal and myself have found that there is a closure of a pair of spiracles accompanied by a closure of spiracular tracheae and their subsequent atrophy, and the development of another pair of spiracles instead. The development of the new pair of spiracles and their spiracular tracheae at an entirely new place forms an exception to the general mode of development. Furthermore, I have found that some of the tracheae also change their place of origin.

(A) Tracheal system of the first instar.

The tracheal system consists of the following main trunks which are well developed even in the newly hatched larva (Text-fig. 1).

- (i) A pair of ventral longitudinal tracheal trunks,
- (ii) A pair of dorsal longitudinal tracheal trunks, and
- (iii) Two transversely placed dorsal commissurals.



Figs. 5, 6, and 7.—Diagrammatic representation of the developmental stages of a spiracle of the first, second, and third instar respectively. Fig. 8.—Fully developed spiracle of *D. eugeniae*. ac., atrial cavity; a.o., atrial opening; int., integument; pr., peritreme; sp.t., spiracular trachea; t., tail; t.o., tracheal opening.

(i) The ventral longitudinal trunks lie one on either side of the body, and extend from the first to the fourth pair of spiracles through which they open to the outside. The fourth spiracle is connected with the ventral trunk through a very small fourth spiracular trachea. From this spiracle the trunk runs forwards, first inwards and then outwards, crossing over the dorsal trunk in the fourth segment. In the third abdominal segment it again bends inwards and crosses over the dorsal trunk in the second abdominal segment. In the first abdominal segment it gives off the third palisade trachea which meets the dorsal trunk lying transversely in this segment. The junction leads to the third spiracular trachea. From the origin of the third palisade trachea the ventral trunk runs medio-anteriorly

and crosses over the posterior transverse commissural in the posterior part of the cephalothorax. In front of this place it runs outwards giving off the second palisade trachea which meets the commissural laterally. The junction leads to the second spiracular trachea. From the point of origin of the second palisade trachea the ventral trunk runs forwards antero-laterally, crossing over the anterior transverse commissural about the middle of the cephalothorax, and as it reaches near the end of the anterior commissural it gives off the very short first palisade trachea to join the anterior commissural, while it itself runs medio-anteriorly towards the mouth. On reaching the mouth it becomes the *oral trachea* and ramifies into the head region. The junction of the first palisade trachea and the anterior commissural leads to the first spiracular trachea (Text-fig. 1).

The other tracheal branches present in the first instar are as follows:—

(a) The *ocular breathing-fold trachea* arises from the first spiracular trachea and runs first antero-laterally and then medially to the inner margin of the eye, ramifying into the region between the eye and the mouth, and the region lying externally to the first thoracic leg.

(b) The *thoracic trachea* originates from the junction of the first palisade trachea and the anterior commissural trachea, and runs postero-laterally ramifying into the peripheral region of the thorax.

(c) The *abdominal trachea* originates from the second spiracular trachea, and runs backwards up to the eighth segment, supplying the peripheral region of the abdomen.

(ii) The *dorsal longitudinal tracheal trunks*.—These are a pair of tracheal trunks originating from the third pair of primary spiracles and extending posteriorly up to the vasiform orifice: these trunks are therefore confined to the area between the first abdominal segment and the vasiform orifice. Each trunk takes more or less the same course as the ventral trunk, and crosses over the ventral trunk in the second, fourth, and eighth segments. Behind the eighth segment, as it reaches beneath the vasiform orifice, it meets its fellow of the opposite side and becomes fused with it. Thus there is no possibility of the presence of a pair of spiracles as described by some other workers (*vide infra*).

(iii) The *dorsal commissural tracheae*.—There are two commissural tracheae, an anterior and a posterior, lying in the posterior part of the cephalothorax; their connections with the ventral trunks have already been referred to.

(a) The *anterior dorsal commissural trachea* runs transversely across the body and connects the first pair of spiracles with each other.

(b) The *posterior dorsal commissural trachea* similarly forms a transverse connection between the second pair of spiracles.



A photomicrograph of the respiratory system of the male pupa of *D. eugeniae*. Lettering as in figs. 1 and 2. ($\times 60$.)

As development proceeds, there is little modification in the main tracheal trunks, only the ramifications grow and the system becomes more elaborate.

(B) Tracheal system of the second instar (Text-fig. 2).

(i) The ventral trunk fuses with the dorsal in the eighth abdominal segment, whence it gives off a branch (absent in the first instar) which divides into two, one of which runs backwards and ramifies into the posterior breathing-fold and may therefore be called the posterior *breathing-fold trachea*, while the other known as the *mycetomal trachea*, runs antero-laterally to the margin ramifying into the mycetomal region. Because of the closure of the original third pair of spiracles, both the spiracular and the palisade tracheae in connection with this pair are reduced. The second palisade trachea gives off a small branch which runs first anteriorly and then posteriorly. The first palisade trachea gives off a big branch, the *ocular breathing-fold trachea*, which divides into three branches—the first ramifies into the inner margin of the eye, the second into the outer margin of the eye, while the third goes to the thoracic breathing-fold. The *oral trachea* becomes divided into two branches, which ramify into the head region.

(ii) The dorsal trunks do not show any branching but show a reduction instead, *i.e.*, the transverse portion which lies between the eighth segment and the vasiform orifice (Text-fig. 1) is absorbed. The dorsal trunk fuses with the ventral in the eighth segment.

(iii) The dorsal commissural tracheae.

(a) The posterior commissural trachea gives off two branches: the outer is the *abdominal trachea* which, in the first instar, originated from the second spiracular trachea but now originates from the posterior commissural. It divides into two branches: one going to the outer margin of the body and the other to the interior of the body. The inner branch remains single and runs posteriorly.

(b) The anterior commissural gives off only the *thoracic trachea* which runs postero-laterally.

Thus in the second instar the ventral trunk and the posterior commissural tracheae show further branching, *i.e.*, they give off five and one branches respectively, the dorsal trunk shows reduction, while the anterior commissural remains unaltered.

(C) The tracheal system of the third instar (Text-fig. 3).

In the third instar a number of important changes take place in the tracheal system. Altogether 40 branches are given off from the main tracheal trunks: 20 from the ventral trunk, 2 from the dorsal trunk, 8 from the posterior commissural

trachea, and 10 from the anterior commissural trachea. An important change is the change of place of origin of the *ocular breathing-fold trachea*, which now originates from the posterior commissural, instead of from the first palisade trachea, as it did in the second instar. There is a reduction of the thoracic trachea, of the third pair of the primary palisade tracheae, and of the third pair of the primary spiracular tracheae, while the third pair of the secondary palisade and the secondary spiracular tracheae show elongation.

(D) The tracheal system of the fourth instar (pupa)
(Text-fig. 4 and Plate 1).

In the fourth instar a large number of new branches arise from the main trunks, and at the same time there is a further ramification of the branches already present. These new branches and the ramification of the tracheal system are shown in fig. 4a. Thus the ventral trunk gives off 247 branches, the dorsal trunk 20 branches, the posterior commissural trachea 55 branches, and the anterior commissural trachea 30 branches. Thus altogether 352 branches are given off from the main tracheal trunks in a fully developed pupa. The *ocular breathing-fold trachea* originates from the spiracular trachea instead of from the anterior commissural as it does in the third instar. I have studied a number of specimens of the pupa of the species *D. eugeniae* and have found the number of tracheal branches always constant. This confirms the findings of previous authors. Woodworth (1901) found 264 branches in the pupa of *Aleurodes citri*, and Roonwal (1935) found 156 branches in the pupa of *Dialeurodes dissimilis*, but as stated above I have counted 352 branches in *D. eugeniae*.

3. General conclusions regarding the tracheal system.

(i) As development proceeds the tracheal system becomes more and more complicated, and the main trunks branch repeatedly.

(ii) During the course of development some branches are totally absorbed, e.g., the *thoracic trachea*, which is well developed in the second instar but is totally absorbed in the third instar.

(iii) Some of the tracheal branches become considerably reduced, e.g., the third pair of primary palisade and spiracular tracheae.

(iv) Some of the tracheal branches, e.g., the *ocular breathing-fold trachea*, change their place of origin in the succeeding instars. In the first and second instars this trachea (Text-figs. 1 and 2) originates from the palisade trachea, in the third instar it originates from the anterior commissural trachea, while in the fourth instar (Text-fig. 4) it originates from the spiracular

trachea. Perhaps this change of position is to provide a better and more copious supply of air to the sensory organs situated anteriorly.

(v) The tracheal branches which run inwards form a network, while those which run outwards towards the margin ramify in a tree-like manner.

(vi) The number of the tracheal branches is constant in a fully developed pupa. This fact is in conformity with the observations of the two other workers, i.e., Woodworth (1901) and Roonwal (1935).

(vii) There is a gradual backward shifting of the tracheal system as shown by Roonwal (1935), a fact supported by my own observations.

(viii) The ventral trunk has the largest number of branches, next comes the posterior commissural trachea, next the anterior commissural trachea, while the dorsal trunk has the least number of branches. As a matter of fact, the dorsal trunk is the least extensive of all the tracheal trunks.

(ix) The main distributing branches always arise either from the palisade or from the spiracular tracheae, i.e., from places nearest the spiracles.

(x) In the first instar the dorsal trunk communicates with the exterior through the primary third pair of spiracles, but as this pair of spiracles closes in the third instar, the dorsal trunk has no direct communication with the exterior after this stage. The dorsal trunk therefore communicates directly with the ventral trunk from which it receives its supply of air. The branches of the dorsal trunk either make loops with the branches of the ventral trunk or run to the interior but they never go to the margin of the body.

(xi) It has been suggested by Roonwal (1935) that perhaps a fifth pair of spiracles exists in *Dialeurodes dissimilis*, just posterior to the vasiform orifice, but in *D. eugeniae* there is no possibility of the fifth pair of spiracles, because both the dorsal trunks fuse with each other beneath the vasiform orifice.

(xii) Hargreaves (1915) suggests that there is an uncertain pair of spiracles in the fourth abdominal segment in *Trialeurodes vaporariorum*. Apparently Hargreaves' mistake arose from the fact that the tracheae in connection with the secondary third pair of spiracles are present even before the spiracles are actually formed, and probably Hargreaves included the secondary pair of spiracles as well as the primary pair in his enumeration.

4. Development of the breathing-folds.

The first instar nymph is free-living and moves actively on the leaf of its host plant. As it becomes fully developed it settles down with its ventral side adpressed against the surface of the

leaf. After this attachment, a chitinous covering develops on the dorsal surface of the nymph. This dorsal covering has no opening except the vasiform orifice situated near the posterior end of the nymph. At this stage breathing-folds are altogether absent. Later, another chitinous covering is developed on the ventral surface of the nymph between it and the leaf surface. The ventral covering has only one opening in the head region for the egress of the mouth-parts. Both the coverings grow centrifugally and are closely adherent to the two surfaces of the nymph.

There are three breathing-folds: the two anteriorly placed are known as *thoracic breathing-folds*, while the third posterior one is known as the *posterior breathing-fold*. Their development is as follows:—

In the first instar the breathing-folds are absent and even their future position (Text-figs. 9 and 10) is not well marked. In fact, breathing-folds are not required at this stage, since the dorsal and ventral coverings of the body have not yet developed and so the spiracles open directly to the outside, there being no need for any accessory respiratory structure to help the spiracles to perform their normal function.

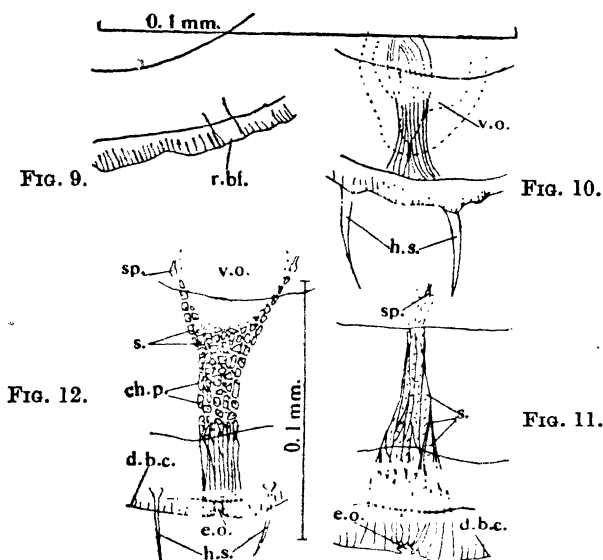
In the second instar breathing-folds begin to develop. Since the body coverings grow centrifugally, breathing-folds also grow centrifugally. As the ventral covering grows and reaches the spiracle, small spines are developed on its dorsal surface near the first pair of spiracles. With the growth of the ventral covering, spines also go on growing. On account of these spines the first pair of spiracles always remains in continuity with the external air. At this stage spines are not developed near the other spiracles which therefore cannot function. When the ventral covering is fully developed, finger-like projections develop near the external opening of the fold, *i.e.*, at the place where the spined ventral covering meets the dorsal covering. This is how the thoracic breathing-folds develop. The external opening of the posterior breathing-fold is also marked.

In the third instar the posterior breathing-fold which is Y-shaped is also developed, *i.e.*, small spines are developed on the dorsal surface of the posterior part of the ventral covering, and thus the fourth pair of spiracles also becomes connected with the external air and can perform its normal function. Later on, accessory openings are formed on the dorsal surface of the body of the nymph just opposite the first pair of spiracles, and beneath the vasiform orifice. Chitinous thickenings are developed on the dorsal covering on the surface next to the nymph. Between these thickenings narrow spaces remain and it is through these spaces that the accessory openings get their supply of air.

Thus a fully developed breathing-fold consists of the following parts:—(i) a roof formed by the dorsal body covering, (ii) a floor formed by the ventral body covering, (iii) an external

opening formed between the two coverings, and (iv) an accessory opening formed in the dorsal body-wall of the nymph.

(i) The ventral surface of the dorsal body covering shows chitinous thickenings which are elongated distally and more or less rectangular proximally. Between these thickenings narrow spaces remain and it is through these spaces that the air entering through the external opening of the fold passes into the accessory opening of the nymph.



Figs. 9 and 10.—Rudiments of the thoracic and posterior breathing-folds of the first instar larva of *D. eugeniae*. Figs. 11 and 12.—Thoracic and posterior breathing-folds of the second instar. *ch.p.*, chitinous thickenings; *d.b.c.*, dorsal body covering; *e.o.*, external opening; *h.s.*, hatching spines; *r.bf.*, rudiment of the breathing-fold; *s.*, spines; *sp.*, spiracle; *v.o.*, vasiform orifice.

(ii) The floor of the breathing-fold is beset with small spines distributed all over its surface next to the ventral body-wall of the nymph. On account of these spines a little space remains between the chitinous ventral covering and the ventral body-wall and thus the air entering the external opening of the fold passes through this space into each of the first pair of spiracles. In the early stages the spines are not distributed on the floor of the posterior breathing-fold. Small porous wax-particles are found between these spines.

(iii) The external opening shows finger-like projections named as *teeth* by Singh (1931). In the early stages the opening shows only a few such projections, but as development proceeds they increase in number.

FIG. 14.

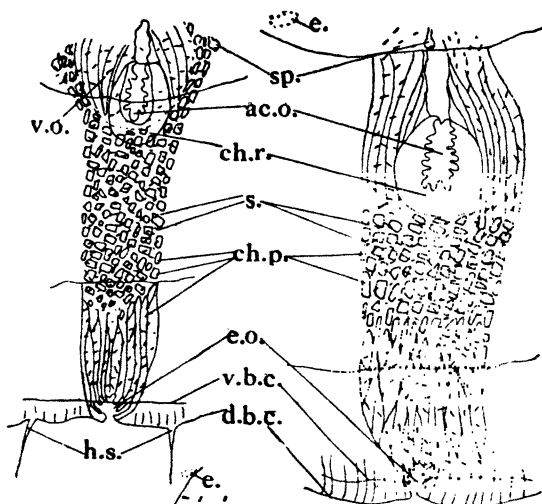


FIG. 13.

FIG. 15.

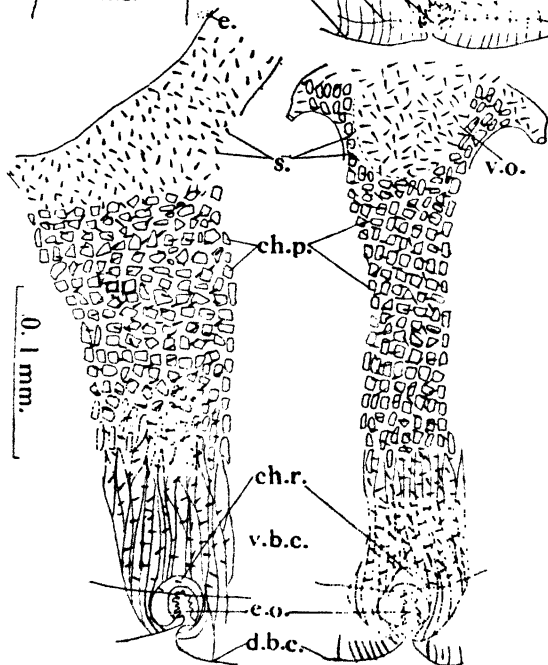


FIG. 16.

Figs. 13 and 14.—Thoracic and posterior breathing-folds of the third instar of *D. eugeniæ*. Figs. 15 and 16.—Thoracic and posterior breathing-folds of the pupa. *ac.o.*, accessory opening; *ch.r.*, chitinous rim; *v.b.c.*, ventral body covering. Other letters as in fig. 9.

(iv) The accessory openings are situated on the dorsal surface of the nymph, two lying just opposite the first pair of spiracles and one beneath the vasiform orifice. Each opening also shows

a number of finger-like projections like the external opening. As already stated, the accessory openings communicate with the external openings through narrow spaces between the chitinous thickenings in the dorsal body covering.

In the fourth instar the breathing-folds show a few important changes.

The thoracic breathing-folds (Text-fig. 15) become very much wider and elongated, and as their bases become very wide, they extend posteriorly from the prothorax to the fourth segment (Text-fig. 4), thus enclosing the first, second and third pairs of spiracles. The external opening of each fold develops further, *i.e.*, the number of finger-like projections increases and they are guarded by a thick chitinous rim. The accessory openings become closed.

The posterior breathing-fold (Text-fig. 16) embraces in front the fourth pair of spiracles. The external opening of the fold is surrounded by a cuticular rim, and the finger-like projections also increase as in the case of the thoracic breathing-folds. The accessory opening also closes.

5. *Functions of the breathing-folds.*

That the breathing-folds are accessory respiratory organs is shown both by their position and structure. It is through these structures that the spiracles perform their function as otherwise they would remain functionless, since they are covered over by the ventral body covering. As air enters the external openings of the folds the solid particles are retained by the finger-like projections surrounding the opening, thus letting in only filtered air. The floor of the fold is beset with small spines thus leaving sufficient space between the ventral body-covering and the ventral body-wall so that air can reach the spiracles situated on the ventral surface of the body. In between the spines small particles of porous wax are found which allow only filtered air to go to the spiracles. Further, in between the chitinous thickenings in the roof (dorsal body covering) of the fold, narrow spaces remain through which the external opening communicates with the accessory opening. The breathing-folds begin to develop as the ventral covering reaches near the spiracles.

The growth of the breathing-folds is therefore a device to connect an increasing number of spiracles with the external air.

6. *Mechanism of respiration.*

As regards the mechanism of respiration in Insects Wigglesworth (1931) says, 'as a general rule it may be said that the movements are confined to the abdomen as a general rule expiration is active, and inspiration passive'. This description holds also for *D. eugeniae*. The first instar is a free-

living larva and moves about actively on the leaf of the host plant. Being active, it needs a very efficient mechanism of respiration. All the tracheal trunks open directly to the exterior,

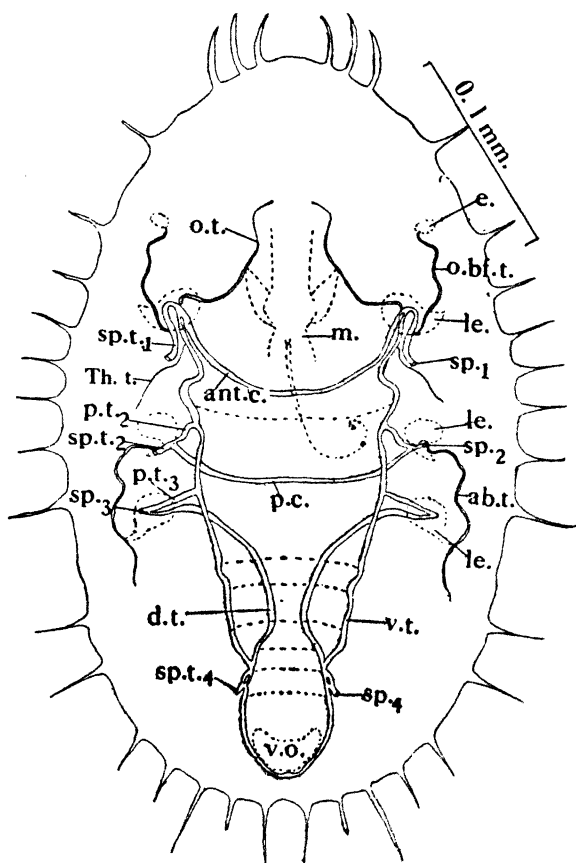
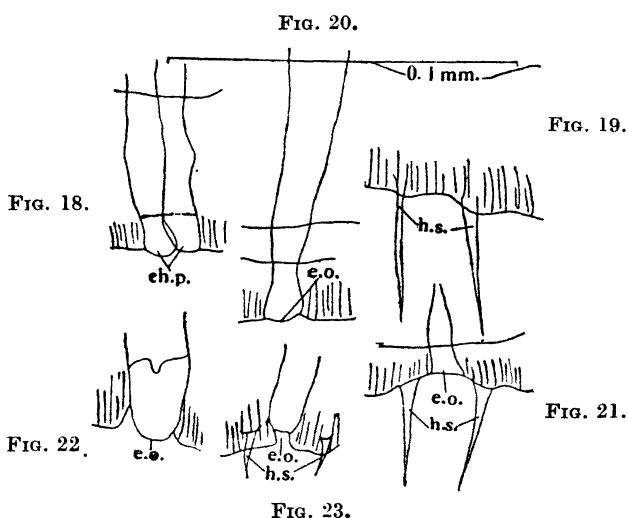


Fig. 17.—The respiratory system of the first instar larva of *Aleurodes* sp., from the ventral side. Lettering as in fig. 1.

and therefore, air enters easily into the tracheal system. The entrance of air is brought about by the pulsation of the posterior portion of the body. There are neither breathing-folds nor accessory openings as these are not needed. As all the four pairs of spiracles are functional, the respiratory system is therefore of *oligopneustic* type (Imms, 1934). After the first instar the nymph becomes adpressed to the leaf and the ventral and dorsal body coverings are developed. Therefore, air cannot enter the tracheal system directly. At this stage the breathing-

folds begin to develop so as to establish a means of communication between the spiracles and the outer air. In the fully developed second instar the thoracic breathing-folds embrace the first pair of spiracles, but the posterior fold does not reach the posterior pair of spiracles. At this stage only the first pair of spiracles can function as it is connected to the external air through the breathing-folds, while other pairs cannot function as they are covered over with the ventral body covering. Since only the first pair of spiracles situated in the prothorax is functional, the respiratory system is of *propneustic* type. In the third instar the nymph becomes further developed, and thus a larger quantity of air is needed, therefore the posterior breathing-



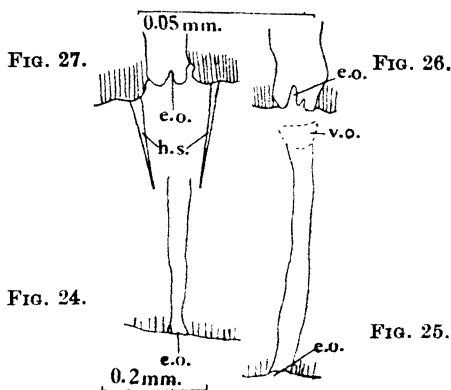
Figs. 18 and 19.—Rudiments of the thoracic and posterior breathing-folds of the first instar larva of *Aleurodes* sp. Figs. 20 and 21.—Thoracic and posterior breathing-folds of the second instar. Figs. 22 and 23.—Distal ends of the thoracic and posterior breathing-folds of the third instar. Lettering as in fig. 13.

fold embraces the fourth pair of spiracles, and accessory openings are also developed. Since both the prothoracic and the posterior pair of spiracles are functional, the respiratory system is of *amphipneustic* type. In the early stages of the fourth instar only the first and the fourth pairs of spiracles are functional and the nymph shows very active (80–90 times per minute) pulsations of the whole body, but in the fully developed pupa the body pulsates only after long intervals. In the pupa all the four pairs of spiracles are functional, so that the respiratory system is again of *oligopneustic* type. At this stage the accessory openings are closed as they are not needed, because all the four pairs of spiracles are functional.

DEVELOPMENT OF THE RESPIRATORY SYSTEM
OF *Aleurodes* SP.

I have also studied the post-embryonic development of the respiratory system of a species of *Aleurodes* (Text-fig. 17). The general plan of development of the spiracles and the tracheae is similar to that of *D. eugeniae*, but the breathing-folds are ill-developed.

In the first instar the breathing-folds are not developed, but the position of the openings of the thoracic breathing-folds is marked by the presence of a pair of thick chitinous rectangular pieces (Text-fig. 18). In the second instar the anterior breathing-folds begin to develop (Text-fig. 20) but remain very narrow. The posterior fold is still undeveloped (Text-fig. 21). In the third instar (Text-figs. 22 and 23) all the breathing-folds are fully developed, but they remain narrow and reach the first and the last pair of spiracles respectively. In the fourth instar the folds are further elongated but otherwise they are similar to those of the third instar (Text-figs. 24 to 27).



Figs. 24 and 25.—Thoracic and posterior breathing-folds of the pupa of *Aleurodes* sp. Figs. 26 and 27.—Distal ends of the same. Lettering as in fig. 13.

The breathing-folds of *Aleurodes* sp. differ from those of *D. eugeniae* in the following points:—

1. The openings of the breathing-folds never show any kind of finger-like projections.
2. There are neither spines nor wax-particles in the breathing-folds.
3. The breathing-folds are very narrow and ill-developed as compared with those of *D. eugeniae*.
4. The accessory openings are not developed in any of the larval instars.

5. The body of *Aleurodes* sp. is very thin as compared with that of *D. eugeniae*.

Though both the species are found on the same host (*Eugenia jambos*) and nearly at the same time of the year, there are marked differences in the development of the breathing-folds of the two species. These differences are probably due to the following reasons:—

1. In *Aleurodes* sp. there is no ventral body covering except in the pupa, and even there, the covering is very thin, while in *D. eugeniae* a chitinous ventral covering is present in the last three instars.

2. All the instars of *Aleurodes* sp. lie on the under surface of the leaf of the food plant where the stomata are always open, while in *D. eugeniae* all the instars lie on the upper surface. In the absence of a ventral body covering the air either from the atmosphere or oxygen from the stomata passes directly into the spiracles.

3. The dorsal body covering except in a fully developed pupa of *Aleurodes* sp. is very thin, while in *D. eugeniae* this covering is very thick.

4. Sometimes the body of *Aleurodes* sp. bends near the folds and thus the spiracles come in direct contact with air.

5. None of the instars of *Aleurodes* sp. lie in depressions in the leaf of the food plant while the last three instars of *D. eugeniae* lie in such depressions.

MATERIAL AND TECHNIQUE.

The material for the present investigation was collected from *Eugenia jambos* (*jamun*) in April 1939. For the study of tracheal system the specimens were mounted either in glycerine or in euparal. To study the spiracles and breathing-folds, specimens were mounted in canada balsam after dehydrating in alcohol and clearing in xylol. For a study of the mechanism of respiration, living specimens were studied under a low magnification. The drawings were made from the ventral side with the help of a camera-lucida.

ACKNOWLEDGMENTS.

This work has been carried out in the Department of Zoology of the Lucknow University under the direct guidance of Prof. K. N. Bahl, to whom I wish to express my deep gratitude for his kind help, encouragement and painstaking correction of the manuscript. I am indebted to Dr. M. L. Roonwal of the Indian Museum, Calcutta, for helpful suggestions and constructive criticism. My thanks are also due to the University for the grant of a research fellowship.

REFERENCES.

1. Deshpande, V. G., (1933).—Anatomy of some British Aleurodidae. *Trans. Roy. Ent. Soc.*, vol. 81, pt. I.
 2. Hearn, E., (1915).—Life-history and habits of the green-house white-fly (*Trialeurodes vaporariorum*). *Ann. Appl. Biol.*, vol. I.
 3. Imms, A. D., (1934).—A general Text-book of Entomology. 3rd ed., London.
 4. Quaintance and Baker, (1913).—A classification of the Aleurodidae pt. I. *U.S. Dept. Agric., Bur. Entom., Tech. Ser.*, No. 27.
 5. ———, (1914).—*Ibid.*, pt. II.
 6. Roonwal, M. L., (1935).—Respiratory system of *Dialeurodes dissimilis*. *Quart. J. Micr. Sci.*, vol. 77.
 7. Singh, K., (1931).—A contribution towards our knowledge of Aleurodidae (white-flies) of India. *Mem. Dept. Agric. India, Entom. Ser.*, vol. XIII, No. 1, pp. 24–26.
 8. Snodgrass, (1935).—Principles of Insect Morphology.
 9. Wigglesworth, (1931).—The respiration of Insects. *Biol. Rev.*, 6: 181–220.
 10. Woodworth, (1901).—Notes on the respiration of *Aleurodes citri*. *Canad. Entom.*, vol. 33.
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**On Catfish Spines embedded in the Mesentery of
Ophicephalus punctatus Bloch.**

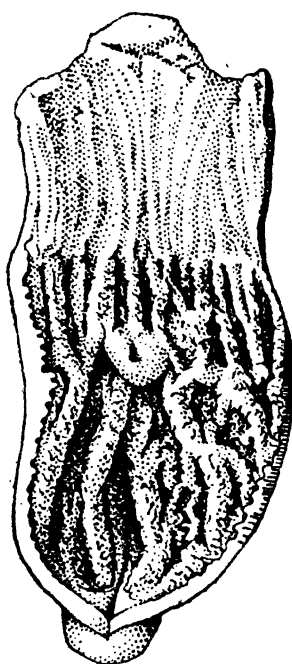
By S. L. HORA and J. N. RUDRA.

In February 1939, one of us (J.N.R.) while demonstrating the dissection of *Ophicephalus punctatus* Bloch to his students found certain bony structures in the mesentery of the fish. These structures were sent to the Zoological Survey of India for determination and were found to be portions of pectoral spines of some Siluroid fish, possibly *Mystus gulio* (Hamilton). Later, preparations of the fin-spines of *M. gulio* were made which enabled us to confirm the identification of the portions of spines found in the mesentery of *O. punctatus*.

There are several records of the occurrence of foreign bodies embedded in the tissues of fishes and, in 1922, Gudger brought them together in one article. At the same time he directed attention to a few new instances that had come under his personal observation. On request, he has very kindly supplied to us a list of recent cases (*vide* List of References) which, with the exception of two, we have not been able to consult as the journals in which they appeared are not available in any of the libraries in Calcutta. From the publications consulted by us it seems that Pipe-fish and Eels of different sorts with their pointed bodies, on ingestion by a larger fish, are sometimes capable of boring through the wall of the stomach and thus reaching the body cavity, where they become mummified in the folds of the mesentery. Besides these living objects, Gudger has also recorded the occurrence of the vertebral column of some fish in the mesentery of a Barracuda (*Sphyræna barracuda*) and on the authority of Mr. Vinal Edward noted two instances in which 'the skeleton of fish' was found embedded 'in the meat near the backbone' of a Hake and a Swordfish respectively. How these foreign objects became lodged in their respective places must remain more or less a mystery until, as pointed out by Gudger, careful dissections of such specimens are made by trained anatomists.

In the case of the fish spines found in the mesentery of *Ophicephalus punctatus*, the explanation is very simple. Catfishes have strong spines in their pectoral fins and in some genera the dorsal spine is also well developed. The pectoral spine has a peculiar joint by means of which it can be set immovably by means of a slight downward or forward twist. When irritated these fishes erect their spines and inflict jagged wounds on account of the serrated edges of the spines. It is well known that 'Pelicans which have swallowed the catfish have been known to

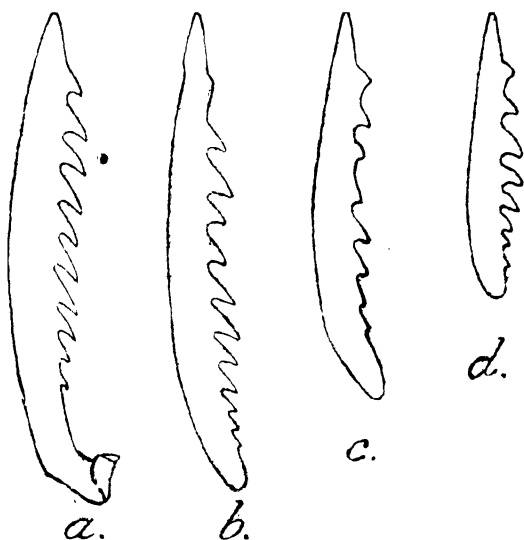
die of the wounds inflicted by the fish's spine. When the catfish was first introduced into the Sacramento, according to Mr. Will S. Green, it caused the death of many of the native "Sacramento perch" (*Archoplites interruptus*). This perch (or rather bass) fed on the young catfish, and the latter erecting their pectoral spines in turn caused the death of the perch by tearing the walls of its stomach. In like manner the sharp dorsal and ventral spines of



TEXT-FIG. 1.—Stomach of a specimen of *Ophicephalus punctatus* Bloch opened to show its thick, muscular walls and the prominent folds of the mucosa.

the sticklebacks have been known to cause the death of fishes who swallow them, and even of ducks. In Puget Sound the stickleback is often known as 'Salmon-killer' (Jordan 1905, p. 179). The position of the spines of *Mystus gulio* in the mesentery of *Ophicephalus punctatus* recalls a somewhat similar encounter between two fishes when the latter must have preyed on the former for food. From the fact that portions of pectoral spines were fully enveloped in mesenteric folds it seems clear that *Ophicephalus* was none the worse for these wounds; this presumed immunity was probably made possible by the highly muscular walls of the stomach and the prominent folds of the mucosa (Text-fig. 1) of *O. punctatus*. The study of eleven spines removed from the mesentery of *O. punctatus* indicates two other important

points. Firstly, the spines are not complete and only in three cases the basal part is present. In most of the spines the basal portion is missing and only the distal half or two-thirds is mummified. The respective lengths of the preserved spines (Text-fig. 2) show that in penetrating through the walls of the stomach they



TEXT-FIG. 2.—Pieces of the pectoral spines of *Mystus gulio* (Hamilton) found embedded in the mesentery of *Ophicephalus punctatus* Bloch.

projected either partly or wholly in the body cavity, for the portions that remained inside the stomach must have been acted upon by the gastric juices and digested; while the portions that projected in the body cavity remained unaffected. Secondly, these mummified spines are very strong and show, as has been remarked by several previous authors, that once lodged in the coelomic cavity no putrefaction or decay takes place and the object remains nicely preserved.

Unfortunately the eleven spines, referred to above, had been removed from their positions and the fish thrown away, so it was not possible to study the stomach walls for scars of wounds. Several specimens of *O. punctatus* have since been examined, but spines were found embedded in the mesenteries of only two in the region of the stomach; each specimen had only one spine. After removal of the mesentery and loose tissues from the outer surface of the stomach wall, one healed up and jagged scar of wound could be seen in the stomach wall of each specimen from the outer side, but on account of the thick folds of mucosa it was not possible to make out any scar from the inner side. These observations confirm the view advanced above that

O. punctatus survives the puncturing of its stomach walls by the spines of *Mystus gulio* from the inner side.

The specimens of *Ophicephalus punctatus*, which harboured the spines, were purchased in February 1939 and March 1940 from the College Street Market in Calcutta and were stated to have been collected from the Salt Lakes. When during the dry season from November to March the waters fall low, large quantities of air-breathing fishes (*Jiol Machh*) of various kinds, including species of *Ophicephalus*, are collected from marshy areas. At this time *Mystus gulio* is also very abundant and basket-loads of it are brought to the Calcutta markets for sale (Hora 1934, p. 132); it is also a very tenacious fish and can even live out of water for several hours (Hora 1935, p. 2).

SUMMARY.

The presence of pectoral spines of *Mystus gulio* (Hamilton) in the mesentery of *Ophicephalus punctatus* Bloch is recorded, and attention is directed to the earlier records of foreign bodies embedded in the tissues of fishes. An explanation as to how the spines became lodged in the mesentery is given and reference is made to certain relevant features in the ecology and bionomics of the two species concerned.

LIST OF REFERENCES.

An asterisk (*) against the name of an author indicates that the paper has not been consulted by us.

- Breder, Charles M. Jr., and Nigrelli, R. F., 1934.—The penetration of a grouper's digestive tract by a sharp-tailed eel. *Copeia*, No. 4, pp. 162, 163, fig.
- * Bullmore, W. K., 1868.—A mummified scabbardfish in the mesentery of a codfish. *Journ. R. Instit. Cornwall*, III, p. 76.
- Deraniyagala, P. E. P., 1932.—A curious association between *Ophichthus apicalis* and percoid fishes. *Spolia Zeylanica*, XVI, pp. 355, 356.
- * Fiebiger, J., 1908.—Ein Angel im Magen einer Bachforelle. *Oesterr. Fischerei Zeitg.*, Wien, V, pp. 275, 276, text-fig.
- Gudger, E. W., 1922.—Foreign Bodies Found Embedded in the Tissues of Fishes. *Nat. Hist.*, XXII, pp. 452–457.
- * H. H., 1906.—*Nerophis ophidion* (L.) (kleine Schlangennadel) in der Leibeshöhle des Herings (*Clupea harengus* L.). *Blätt. Aquar.-Kunde*, XVII, p. 9.
- * Hamon, W. A., 1932.—Hamivorous fish. *Science*, LXXV, p. 243.
- Hora, S. L., 1934.—Sun-Shades for Fishes. *The Aquarium*, III, pp. 132, 133.
- Hora, S. L., 1935.—Physiology, Bionomics and Evolution of the Air-breathing Fishes of India. *Trans. Nat. Inst. Sci. India*, I, pp. 1–16.
- * Huntsman, A. G., 1935.—Trout fingerlings killed by natural fishhooks or spears: the seeds of *Bidens*. *Canad. Field-Nat.*, II, pp. 135, 136.
- * Hurst, C. T., 1931.—A curious fish story. *Science*, LXXIV, pp. 515, 516.
- Jordan, D. S., 1905.—*A Guide to the Study of Fishes*, I, p. 170, New York.
- * Leonard, J. W., 1938.—When a fish and a (*Bidens*) burr collide. *Mich. Conservation*, VII, No. 10, p. 3, fig.
- * Ogris, O., 1924.—Ueber Riesenzellenbildung bei Fischen nach Fremdkörpereinheilung. *Virchow's Arch. Path. Anat.*, Berlin, CCLIII, pp. 350–363.
- * Souché, G., 1935.—Sur la présence d'oursins chez la sole (*Solea lascaris* Risso). *Bull. Sta. Biol. Arcachon*, XXXII, pp. 51, 52.

On Trematodes Collected in Pilibhit (North India).

By B. S. GOGATE.

(Communicated by Dr. B. Prashad.)

Family LEPODERMATIDAE LOOSS, 1901.

Prosthogonimus cuneatus (Rudolphi, 1809) Braun, 1901.

Host: *Francolinus gularis* (Temmnick, 1815).

Location: Bursa fabricii.

Locality: Pilibhit.

Description.— 5.26×2.97 ¹. Oral sucker 0.265 in diameter. Ventral sucker 0.757×0.817 , situated at 1.12 from anterior end of the body. Pharynx 0.144×0.196 . Oesophagus 0.231 long. Testes $0.861-0.901 \times 0.760-0.794$, separated from each other by 0.57 and situated two-third of their dimensions in the anterior half of the body. Cirrus sac 1.01×0.115 , sinuous and extending behind the caecal fork but not reaching the ventral sucker. Ovary much lobed, submedian (more on the right side), 1.01 in its long (transverse) diameter and slightly overlapped by posterior border of ventral sucker. Vitellaria follicular, not broken up into clusters, and extending into posterior half of the body. Uterus for the most part post-testicular; uterine coils cross the caeca, and in front of the ventral sucker its terminal portion runs alongside the cirrus sac. Ova $0.0192-0.0269 \times 0.0092-0.0130$.

Remarks.—In view of the findings of Witenberg and Eckmann (1939) this form is assigned to *Prosthogonimus cuneatus* neglecting slight variations in the dimensions and situations of various structures. The authors referred to, have reduced the number of valid species of the genus to seven, on the ground that 'most of them depend on age or on the state of contraction or individual variations'. They suggest that the species should be distinguished on the basis of: (1) relative sizes of oral and ventral suckers, (2) the character of uterine coils, and (3) the shape and distribution of vitellaria considered relatively. Any attempt to describe a new species on the assumption of host-specificity is further to be abandoned because the same authors record that *Prosthogonimus* are noted for their lack of this specificity and geographical distribution.

¹ All measurements in millimetres.

Family PSILOSTOMIDAE Odhner, 1913.
Psilorchis indicus Thapar and Lal, 1935.

Host : *Alcedo ispida* Linnaeus, 1758.

Location : intestine.

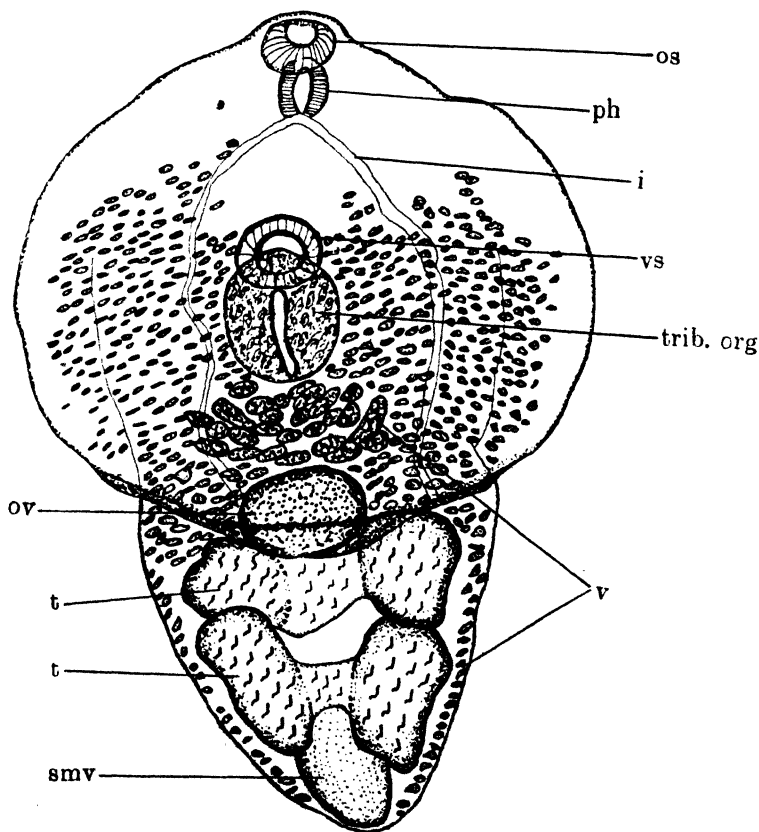
Locality : Pilibhit.

A specimen of this species was obtained from the kingfisher *Alcedo ispida* Linn. The measurements recorded by Thapar and Lal (1935) are given below for comparison; but the variations observed do not appear to the author to be of specific value, more particularly in view of the similarity of hosts.

	Author's measurements.	Thapar and Lal's measurements.
Length	.. 8.31	8.57
Breadth	.. 1.00	1.17
Cuticle	.. spiny in anterior part of the body.	smooth
Oral sucker	.. 0.219×0.243	0.17×0.10
Ventral sucker	.. 0.79×0.682	0.75×0.65
Pre-pharynx	.. 0.037 long	0.18 long
Pharynx	.. 0.121 in diameter	0.18×0.16
Oesophagus	.. 0.146 long	0.09 long
Anterior testis	.. 0.682×0.336	0.75×0.42
Posterior testis	.. 0.707×0.341	0.75×0.36
Cirrus sac	.. 0.468×0.195 retort shaped right sided.	
Ovary	.. 0.297×0.273	0.41×0.25
Ova	.. $0.097-0.195$ X $0.048-0.100$	$0.125-0.130$ X $0.08-0.100$
Host	.. <i>Alcedo ispida</i>	<i>Halcyon smyrnensis</i>
Location	.. intestine	intestine
Locality	.. Pilibhit	Lucknow

Remarks.—The absence of cuticular spines in this species may be due either to old age or incomplete observation. In their original records of the species (Thapar and Lal, 1935) and the diagnosis of the genus no description of a cirrus sac is given, though in the key to the species by Lal (1939) it is specifically mentioned. In order to clarify the position both authors were individually requested for the loan of slides without success. It is therefore suggested that the structure surrounding the vesicula seminalis as shown in figure 3 (Thapar and Lal, 1935) and directly observed by the present author is a true cirrus sac. The diagnosis of the genus *Psilorchis* should therefore be emended to include 'spiny cuticle and retort shaped cirrus sac enclosing a voluminous vesicula seminalis'.

Family DIPLOSTOMIDAE Poirier, 1886.

Neodiplostomum gumbudia, sp. nov.*Host*: *Milvus govinda* Sykes, 1832.*Location*: intestine.*Locality*: Pilibhit.

TEXT FIG. 1. *Neodiplostomum gumbudia*, sp. nov., Entire ventral view.

i., intestine; *os.*, oral sucker; *ov.*, ovary; *ph.*, pharynx; *smv.*, seminal vesicle; *t.*, testis; *trib. org.*, tribocytic organ; *v.*, vitellaria; *vs.*, ventral sucker.

Description.—Total body length 0.926. Both body segments broader than long: Anterior body segment 0.556×0.669 , lateral folds absent, lateral margins of the segment meeting ventrally behind tribocytic organ. Posterior body segment 0.370×0.422 .

Oral sucker 0.053×0.085 . Pharynx 0.058×0.052 . Oesophagus absent. Caeca distinct only in the anterior body segment. Ventral sucker 0.068×0.075 , approximately half overlapped by tribocytic organ. Tribocytic organ elliptical, 0.137×0.131 , situated in middle of the anterior body segment. Ovary transversely oval, 0.098×0.151 , situated near the junction of the anterior and posterior body segments, ventrally partly anterior to and partly posterior to the ventral union of lateral margins of the anterior body segment. Testes big and ventrally concave; anterior testis 0.320 and the posterior testis 0.294 in breadth. Vesicula seminalis voluminous; bursa reduced; genital pore subterminal. Vitellaria anteriorly extending as far as the caecal bifurcation and posteriorly and laterally they extend to the end of the body. Vitelline follicles fine and thinly spread out except in the area between the posterior border of the tribocytic organ and the anterior border of the ovary, where the follicles are clustered in the form of thick large sized bodies. Ova not developed.

Remarks.—In its very small size this form differs from all the species of the same genus except *N. biovatum* Dubois, 1937; *N. ellepticum* (Brandes, 1888) La Rue, 1926; and *N. globiferum* Verma, 1936. From *N. biovatum* and *N. globiferum* it is distinguished by the ventral sucker being half overlapped by the tribocytic organ. From *N. ellepticum* it is separated by the absence of lateral folds, the smaller ratio of the posterior body segment length to that of the anterior body segment length, smaller size of the tribocytic organ, marked clustering of the vitellaria between the tribocytic organ and the ovary, and other minor differences.

Family STRIGEIDÆ Railliet, 1919.

Strigea falconis Szidat, 1928.

Host: *Neophron percnopterus* (Linnaeus, 1758).

Location: intestine.

Locality: Udaipur (Pilibhit).

Description.—Body 2.183 – 2.363 long, strongly curved, with tribocytic organ retracted or stretched out of cup shaped anterior body segment. The cup shaped anterior body segment 0.741 – 0.822×0.914 – 0.964 , separated from the posterior body segment by a deep constriction. Posterior body segment 1.361 – 1.622×0.718 – 0.762 .

Vitellaria very thickly distributed in both the body segments, consisting of large sized follicles and masking practically the entire anatomy in whole mounts. The measurements given below, except those of eggs and bursa, are taken from sections.

Oral sucker 0.119×0.139 . Pharynx 0.066×0.085 . Oesophagus not distinct. Ventral sucker 0.186×0.180 . Tribocytic

organ with two folds, one dorsal and one ventral, visible outside in the stretched condition through the cup shaped anterior body segment. Ovary 0.220×0.255 , separated from the anterior testis and situated behind the junction of the posterior body segment with the anterior body segment. Testes partially overlapping each other: Anterior testis 0.357×0.192 . Posterior testis 0.317×0.232 . Bursa 0.130 deep, with small genital cone. Ova few in number, $0.065-0.105 \times 0.050-0.069$.

ACKNOWLEDGMENT.

I have to express my thanks to Mr. L. N. Johri who handed over to me for investigation the trematodes he collected in summer at Pilibhit proper or Udaipur (Pilibhit) and which form the subject of the present paper.

REFERENCES.

- DUBOIS, G. (1938).—Monographie des Strigeida (Trematoda). *Mém. de la Soc. Neuchatel. des Sci. Nat*, Tome VI.
- LAL, M. B. (1938).—On a new species of *Psilorchis* from the intestine of the common teal, *Nettion crecca*. *Livro Jubilar Travassos* 1938, 259-262.
- LAL, M. B. (1939).—Studies in Helminthology—Trematode Parasites of Birds. *Proc. Ind. Acad. Sci.*, Sec. B, Vol. X, No. 2, 1939, 111-200.
- THAPAR, G. S. and LAL, M. B. (1935).—On the Morphology of a New Genus of Trematode Parasite of the Kingfisher from Lucknow. *Proc. Ind. Acad. Sci.*, Sec. B, Vol. II, No. 1, 1935, 88-94.
- WITENBERG, G. G. and ECKMANN, F. (1939).—On the Classification of the Trematode Genus *Prosthogonimus*. *Vol. Jubilar Prof. S. Yoshida*, Vol. II, 129-143.

**A Note on *Cassia javanica* L. and *Cassia nodosa* Ham.
with a Key to the Cultivated Tree Cassias.**

By V. NARAYANASWAMI.

(Communicated by Dr. K. Biswas.)

The commonest sight, during the months of April to June, in Calcutta, especially in the public parks and in a number of private gardens, is that of the two most beautiful of ornamental plants, namely, *Cassia nodosa* Ham. and *Cassia javanica* L. in flower. The numerous clusters of pink flowers and the gracefully spreading and pendulous feathery-leaved branchlets cannot fail to arrest, at once, the eyes of every lover of nature. They resemble each other so very closely in general appearance and in the colour of the flowers that it has become a matter of difficulty for the casual observer to distinguish one from the other.

Cassia javanica L. was the first of the two species to be known to science and Linnaeus published it in the first edition of his *Species Plantarum* in 1753, with the brief description that it was a species with 12 pairs of oblong, obtuse, glabrous leaflets, with its habitat in India. *Cassia nodosa* was first introduced into the Sibpur Botanical Garden in the year 1798 by Francis Buchanan (later Buchanan Hamilton) from Chittagong. Roxburgh published it first in his *Hortus Bengalensis* in 1814 as *Cassia nodosa* Ham. without a description. It was, however, published with a complete description in 1832 in the second volume of the *Flora Indica* by Roxburgh. Hamilton's name was most probably only a manuscript name given to it by Hamilton when it was first sent to his friend Roxburgh for cultivation in the Sibpur Botanical Garden. A noteworthy point about *Cassia nodosa* Ham. is that it has never been collected in a truly wild state either from Chittagong or elsewhere since Hamilton's day.

Two years after the introduction of *Cassia nodosa* Ham. into the Sibpur Botanical Garden, Roxburgh introduced in 1800 another beautiful Cassia, namely, *Cassia bacillus* Gaertn. the seeds of which he obtained from Sumatra through Dr. C. Campbell. This was first published without description in the *Hortus Bengalensis* in 1814 and again with full description in the *Flora Indica*, Vol. ii, p. 337 in 1832. Roxburgh had pictures made of these two plants which are now available in his unpublished Icones in the Sibpur Library. *Cassia bacillus* Gaertn. has since been universally identified with the earliest *Cassia javanica* Linn. and there seems no reason to doubt it.

Roxburgh described the two plants thus:—

<i>Cassia javanica</i> L. (<i>C. bacillus</i> Gaertn.)	<i>Cassia nodosa</i> Ham.
Stem spiny.	Stem not spiny.
Leaves 8–14 pairs, shortly petioled, oval, oblong, entire, very obtuse or even emarginate and smooth.	Leaves 8–12 pairs, ovate and ovate-lanceolar or sub-lanceolate.
Stipules crescent-shaped, lower half narrower, less obtuse, upper half much broader and emarginate with a bristle.	Stipules obliquely crescent-shaped, extremities lengthened into long, subulate spurs, adnate.
Racemes terminal on short lateral branchlets.	Racemes lateral on the naked 2 or more year old branchlets, simple.
Petals oblong.	Petals lanceolate.

In their account of 'Some Beautiful Indian Trees', in the *Journ. Bombay Nat. Hist. Soc.*, Vol. 35, pp. 289–291, Blatter and Millard have figured and described these two *Cassias*. Their descriptions agree exactly with those of Roxburgh. They add there, that, like the Java Cassia (*C. javanica* L.), the flowers in *C. nodosa* 'come out in big distant clusters; . . . grouped along the branches in pairs or solitary and grow from the axils of the leaves or more usually above the scars of fallen leaves'. Their plate No. 13, which they have called *C. javanica* L. does not agree with their description of the species and it is certainly not the Linnean species, but is typical *C. nodosa* Ham. The attention of late Father Blatter was drawn to this when he was alive and he agreed with my identification of the plate as *C. nodosa* Ham.

The examination of a large number of specimens of these two species from trees which are in cultivation in and around Calcutta and of the herbarium materials coming from different parts of India has led me to conclude that by some inexplicable circumstance Roxburgh or his publisher has interchanged the description of one with the other. Probably Roxburgh's artists who drew for him the figures of *C. bacillus* Gaertn. and *C. nodosa* Ham. were responsible for this unfortunate mistake. Except for the unpublished *Icone* N. 1835 of Roxburgh's *C. nodosa* Ham. in the Sibpur library, there is perhaps no possibility of verifying the description of *C. nodosa* Ham. with his type as the latter is not available at Sibpur. Roxburgh cited Rumphius's plate No. 22 of *Herbarium Amboinense* under his *C. bacillus* Gaertn. but I consider that Rumphius's plate No. 22 is certainly not *C. javanica* L., but that it is only *C. marginata* Roxb. which can easily be made out by the ovate, subulate stipules and the axillary panicle of small flowers, with oblong, elliptic, acute, petals.

As accepted by all authors, the outstanding character of *C. javanica* L. is the oblong, obtuse leaflets. There are other well-marked characters also which distinguish the Java Cassia

from the rest of *Cassias* with flowers of the same colour. There are several plants of the typical *C. javanica* L. growing in Calcutta of which the best specimen is in the north-eastern end of the Zoological Garden, Alipore. There are also specimens of this plant in the Royal Botanical Garden, Sibpur, and in the Agri-Horticultural Gardens, Alipore. There was a beautiful specimen of this rare *Cassia* in the Curzon garden, Calcutta. But it had to be cut down probably on account of injury. This *Cassia*

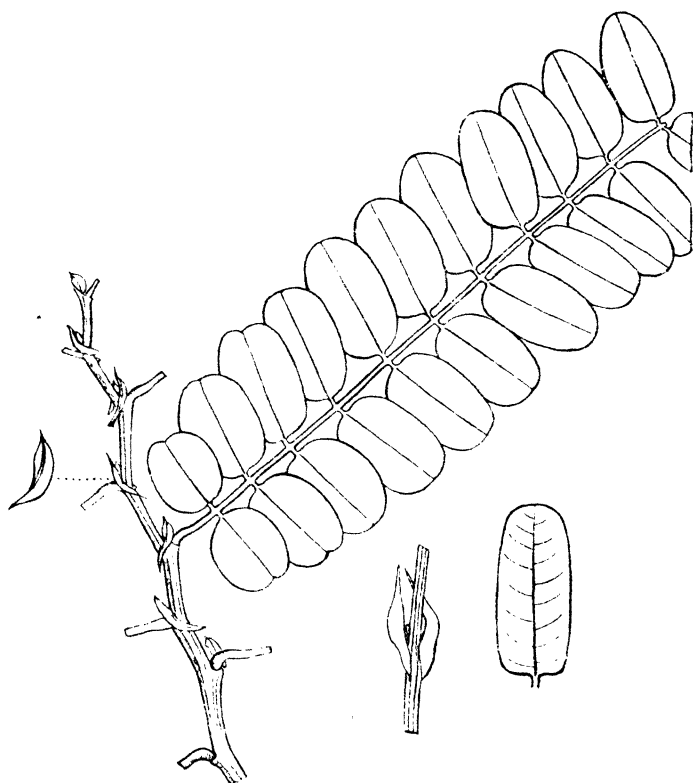


FIG. 1.- *Cassia javanica* Linn.

appears to be the rarer of the two *Cassias* under discussion and greater attempt should be made to spread this more extensively than has been the case hitherto. If proper attention is not paid, it may become extinct in no distant date.

C. JAVANICA L.

C. javanica L. is a medium sized tree about 30 ft. high and with a circumference of 1-5 ft. at the base, spiny on the

trunk below, with a flat or round spreading crown and with feathery-leaved long drooping branchlets. There are 9-14 pairs (usually fewer) of oblong, round, obtuse, often retuse and mucronate leaflets; opposite below and alternate above, veins distant and with narrow crescent-shaped stipules. The stipules, especially those at the tips of the young branchlets, have their ends produced into short subulate spurs or tails. This feature of the stipules is attributed by Roxburgh to *C. nodosa* Ham. but it is scarcely so in the specimens with oblong, obtuse leaflets which are typical of *C. javanica*. The flowering racemes are stout, long, simple or in pairs, arising chiefly from the axils of the scars of fallen leaves, rarely from the tips of lateral branchlets; petals broadly oblong, elliptic, obtuse, pink in colour, fading to white.

C. NODOSA HAM.

C. nodosa Ham. grows to a larger size than *C. javanica* L. It is thorny on the trunk below when young only, but unarmed when older. The crown is flat and spreading with long drooping branchlets. The leaflets are 9-14 pairs, more often more, bifarious, ovate, oblong or lanceolate, acute or acuminate, with truncate bases and close-set veins. Stipules are broad, foliaceous, crescent-shaped, the upper half broader with a distinct midrib ending in a short mucro and the lower half shorter, narrower and veinless. Even at the tips of the young branchlets, this feature of the stipule is very characteristic in this species. Roxburgh attributed this character to the Java Cassia, but examination of a number of trees in cultivation in and around Calcutta has not supported that view. The position of the inflorescence is also another point of distinction between the two species. The inflorescence is a corymbose panicle of deep pink flowers at the tips of lateral branchlets. It has not been observed to be a simple solitary stout raceme arising from leafless old branchlets as in *C. javanica*. The petals are deep pink in colour, narrow, ovate, acute or obovate with a short claw. The shape of the leaflets and the stipules is alone sufficient to distinguish *C. nodosa* Ham. from *C. javanica* L.

In *C. nodosa*, the leaflets are very variable, the lowermost leaflets in some of the leaves are sometimes oblong, obtuse and even retuse. These two species are known now only in cultivation and there are numerous varieties which have probably evolved out of these two species or from only one of them. Gagnepain without assigning any reason, has reduced *C. nodosa* Ham. to *C. javanica* L. in *Flora Generale de l' Indo-China* in 1913. Later authors have not accepted this view and have treated them as two separate species. As hybrid Cassias are now coming to light under horticultural and natural conditions, it is more than likely that *C. nodosa* Ham. is of the nature of a hybrid or a variety of *C. javanica* L. But without a knowledge

of the nature of the chromosome contents of the two species, it is impossible to fix the relationship between the two species. It is a problem open to cytologists of this group of Indian plants.

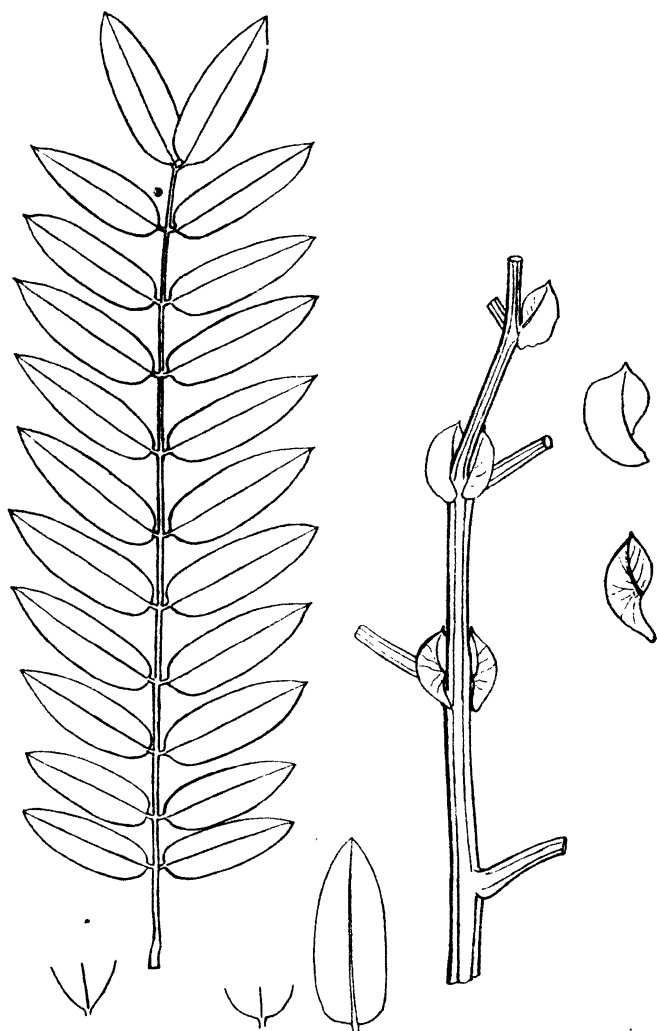


FIG. 2.—*Cassia nodosa* Ham.

OTHER TREE CASSIAS.

Besides these two species, there are other tree Cassias with beautiful flowers, in cultivation in the gardens and parks of

Calcutta. Of these, the Burmese pink Cassia, known as *Cassia renigera* is equally attractive in the profusion of its pink flowers, borne on drooping branches. But it is easily distinguished from the first two species by the peculiar kidney-shaped stipules and broadly ovate, subulate and auricled floral bracts. The next is what is called as Red Cassia—*C. marginata* Roxb., a smaller round-topped tree 15–20 ft. high and with slender downward curving branches. There are 10–20 pairs of small, oblong leaflets, oblique and acutely narrowed at the base, obtuse and emarginate at the tips with a distinct mucro in the middle. The flowers are smaller and some of the stamens have no swelling in the middle as is common to the three first Cassias. There is another tree Cassia with pink flowers known as Horse Cassia *C. grandis* L.f., a native of America, but which has come into cultivation in several gardens of India. This is distinguished from those with pink flowers chiefly by the compressed cylindrical pod, 'rough with transverse markings, one margin, with a prominent obtuse rib, the other with 2 prominent ribs'. The pod is 1–1.9 ft. long and not 3 inches or less as stated by Blatter. *Cassia fistula* L. is the common Indian laburnum with pendulous racemes of golden yellow flowers. Though it is similar in the nature of its cylindrical pods to the pink or red Cassias, it is easily distinguished from them by its fewer pairs of broad, ovate leaflets and yellow flowers which do not have the nodose swelling in some of the stamens. *Cassia siamea* is another of the avenue plants, common in Calcutta and is made out easily from the rest by the numerous thickly coriaceous, glabrous leaflets, its terminal panicle of small yellow flowers and its strap-shaped pods.

Cassia multijuga Rich. is a shrub with numerous pairs of small close-set oblong, obtuse, emarginate leaflets and a terminal panicle of small yellow flowers and a strap-shaped pod. An artificial key is appended for the easy recognition of the several species.

Artificial key to the cultivated Cassias.

A. Pod smooth, cylindrical, long.

AA. Flowers yellow *C. fistula* L. 1.

AAA. Flowers pink or red—floral
bracts narrow, ovate,
subulate.

Leaflets small, oblong, oval, *C. javanica* L. 2.
obtuse or emarginate at
the tip, base equal,
round, stipules semilunate
with 2 subulate tails from
the ends.

Leaflets small, narrow, *C. marginata* Roxb. 3.
oblong from an oblique
base, obtuse, emarginate
with a median mucro.

- Leaflets bigger, oblong, *C. nodosa* Ham. 4.
 ovate, acute, base equal,
 acute or somewhat round,
 stipules semilunate with
 the upper half broader
 and bigger.
- AAAA. Flowers pink, floral bracts *C. renigera* Wall. 5.
 broadly ovate, subulate,
 with two obtuse basal
 auricles, cauline bracts
 reniform.
- B. Pod, cylindrical, rough, compressed; leaflets *C. grandis* L.f. 6.
 narrow, oblong, obtuse, round at both ends.
- C. Pod, smooth, strap-shaped, flowers yellow.
- C'. Leaflets, thick, coriaceous, glabrous, *C. siamea* Lam. 7.
 narrow, long, oblong, obtuse, emar-
 ginate and mucronate. Flowers
 yellow, stamens subequal.
- C". All stamens perfect. Pod 6-8", flat. *C. glauca* Lam 8.
- C"". A shrub, leaflets many, small, oblong, *C. multijuga* Rich. 9.
 obtuse, emarginate, mucronate,
 minutely puberulous on both sides.

SUMMARY.

The correct identification of the two most beautiful of tree Cassias, namely: the Java Cassia, *Cassia javanica* L. and the Busuk-Busuk *C. nodosa* Ham., that are commonly met with in cultivation in several parts of India has for long been unsatisfactory. Of these, the Java Cassia is the oldest species, established by Linnaeus in 1753. Probably on account of long cultivation under artificial conditions, it has become very variable and it may not be unlikely that *C. nodosa* Ham., is one of such variations that has now become firmly established with clear-cut characters of a true species. Cytogenetic tests may perhaps solve this probability. Apart from this supposition regarding the origin of *C. nodosa* Ham., these two species differ from each other markedly so as to considerably minimize the chances of their being mistaken one for the other.

C. javanica is easily distinguished from *C. nodosa* by: (1) the semilunate stipules, produced at the two ends, into two subulate tails, (2) by the small, oblong, oval leaflets, equal and rounded at the base and rounded, obtuse or slightly emarginate at the tip, and (3) by the oblong, obtuse, petals rounded at both ends. In *C. nodosa*, on the other hand, the leaflets are oblong, ovate, acute apically and acute or somewhat rounded at the base; the stipules are semilunate with the upper half broader with a distinct median nerve ending in a mucro and the petals are long, narrow, oblong, acute at both ends.

LITERATURE CONSULTED.

1. Benthams, G., 1871.—Revision of the genus *Cassia*, p. 177.
2. Blatter, E. and Millard, 1931.—Some Beautiful Indian trees, in *Journ. Bomb. Nat. Hist. Soc.*, 35 : 289-91.
3. Brandis, D., 1906.—Indian Trees, p. 253.
4. Breyns, J., 1739.—*Prodromus Fasciculi Rariorum Plantarum*, Fasc. 2 : 51.
5. Craib, W. C., 1928.—*Flora of Siam*, Vol. I : 508, 511, 512.
6. De Candolle, A. P., 1825.—*Prodromus Regni Vegetabilis*, ii : 490.
7. Gaertner, J., 1791.—*De Fructus*, Vol. ii : 313.
8. Gagnepain, F., 1913.—*Flora Generale de l'Indo-China*, ii : 158.
9. Haines, H., 1922.—*Botany of Bihar and Orissa*, iii : 302-303.
10. Hasskarl, J. K., 1847.—*Plantae Javanicae Rariores*.
11. Hooker, J. D., 1876.—*Flora of British India*, ii : 261, 267.
12. King, G., 1898.—Materials for a Flora of the Malayan Peninsula in *Journ. Asiat. Soc. Bengal*, LXVI (2) : 155, 156.
13. Koorders, S. H. and Valetton Th., 1894.—*Boomsarten von Java Bijdr.*, Band ii, 8.
14. Kurz, S., 1877.—*Forest Flora of Burma*, i : 39.
15. Linnaeus, C., 1753.—*Species Plantarum ed.* i : 379.
16. Merrill, E., 1910.—*Philippine Jour. Sci.*, v : 48.
17. ——— 1918.—*Species Blancoanae*, p. 174.
18. ——— 1923.—Enumeration of the Philippine Plants, p. 263.
19. Miquel, F. A. G., 1855.—*Flora Indiac Batavae* i : 90, 91.
20. Prain, D., 1898.—Some additional Leguminosae in *Journ. Asiat. Soc. Bengal*, LXVI (2) : 474.
21. Ridley, H. N., 1924.—*Flora Malayan Peninsula*, 1 : 619.
22. Roxburgh, W., 1814.—*Hortus Bengalensis*, p. 31.
23. ——— 1832.—*Flora Indica*, ii : 336-337.
24. ——— 1835, 1836.—*Icones inedit.*
25. Rumphius, G. E., 1750.—*Herbarium Amboinensi*, ii : 88, t. 22.
26. Wight, R., 1852.—*Icones Plantarum Or.* t. 410.
27. ——— and Arnott., W., 1834.—*Prodromus*, p. 286.
28. (Anon.) 1903.—*Proceedings of the Agri-Horticultural Society of India (N.S.)* : 67-68.



Blood Grouping in the Deccan and Eastern Ghats.

By EILEEN W. E. MACFARLANE.

In order to fill in some of the great blank space in the blood group survey map of India which stretches from east to west, right across the centre of the country (Sarkar) an extensive trip was undertaken into the Deccan and Eastern States Agency early in 1940.

Any field worker who has contacted our tribes and aboriginals knows that they usually occupy inaccessible areas and that it is frequently difficult to persuade them to co-operate in an unusual project. Most of them are independent minded, as well as suspicious and superstitious folk. Weird rumours may circulate about the motives of a person who attempts to collect drops of their blood. Should they be alarmed or offended in any way they stage a spontaneous boycott, even hostile demonstrations are still not unknown. Now that they are familiar with medical officers, who vaccinate and inoculate, a blood tester can pass as such and presents of sweets, nuts and glass bracelets overcome a lot of resistance. Even so some Banjaras refused to co-operate because blood had been taken first from the Bhils and many of the Chenchus simply stole away into the forest leaving the villages to us. The other workers in India will realize that it is often impossible to obtain the 200 samples from each community which the statisticians demand (Boyd) without a prolonged, uncomfortable and expensive sojourn. Even if one decides to stay on hopefully, there is no guarantee that those who refused at first will relent later. Distances are great and transportation slow and it is often impossible to replenish stocks of test sera without days of delay.

Although my samples fall short I hope to show that they are probably representative and that these data throw light on blood group distribution in south-eastern Central India.

METHODS ADAPTED TO FIELD CONDITIONS.

The technique followed was that previously used in the laboratory, i.e. open slides in petrie dish moist chambers (Macfarlane, 1939). Small sterile test-tubes with cotton plugs and containing 1 c.c. normal saline were prepared each morning.

These, in their stands, were carried into the jungle or village in a light wooden box, together with spirit lamp, swabs and presents for donors. Name, sex, approximate age, caste or tribe and birthplace are recorded for each person just before he is punctured and the number of the corresponding test-tube is noted in the ledger. Blood was taken from finger-tips, even though some were unbelievably dirty and gnarled, because the people prefer this. Speed is important, and once a crowd starts to dwindle, deserters are difficult to catch. For this reason the blood was collected directly into the test-tube. Malaria and poor diet cause a lot of anaemia among tribal people and it may be necessary to take three or four drops in some cases. In hospitals and prisons everything is simple. Prisoners in Hyderabad and Bastar States showed the benefit of a balanced, adequate diet and medical care in the quality of their blood. In the villages a flamed pin, which can be concealed between the fingers to administer a quick, painless puncture, when the donor's attention is diverted, is less alarming than a surgeon's needle. Each pin should be used only two or three times. Presents should be given after the blood is obtained.

When all available bloods had been taken the samples were carried back to the rest-house in the box. The supernatant fluid was poured off each deposit of red blood cells, before testing, and sufficient saline added to give about a 2% suspension, judged by the colour. Bloods were sometimes left in the test-tubes for four or five hours and transported for many miles without any deleterious effect. After five hours some haemolysis occurred in a few samples when the temperature was over 90°F. The samples were usually washed and tested in two or three hours after collection.

The test sera were checked each day with Group AB and Group O blood cells. Also a selection of samples was always retested as a further check. The opened ampoules of test sera were sealed with plasticine clay, if necessary, and kept on ice in a vacuum bottle.

CHENCHUS.

The Chenchus are a small forest tribe, still in the food hunting stage of culture, who have attained considerable fame in anthropology, thanks to the interest and activity of Mr. Gulam Ahmed Khan (1931), last Census Commissioner of the Nizam's Dominions. Dr. B. S. Guha and Dr. J. H. Hutton both visited this tribe in the company of Mr. Ahmed Khan in connection with the last census, at different times, and the former was able to measure twenty-three of them (Guha, 1933). I was fortunate enough to have the same guide.

The Chenchus inhabit a rocky plateau in Amrābad Taluk, north-east of the Kristna River, in Mahbubnagar District on the southern border of Hyderabad State.

A cholera epidemic a few years ago killed hundreds of these forest folk and it was the opinion of the Forest and Medical

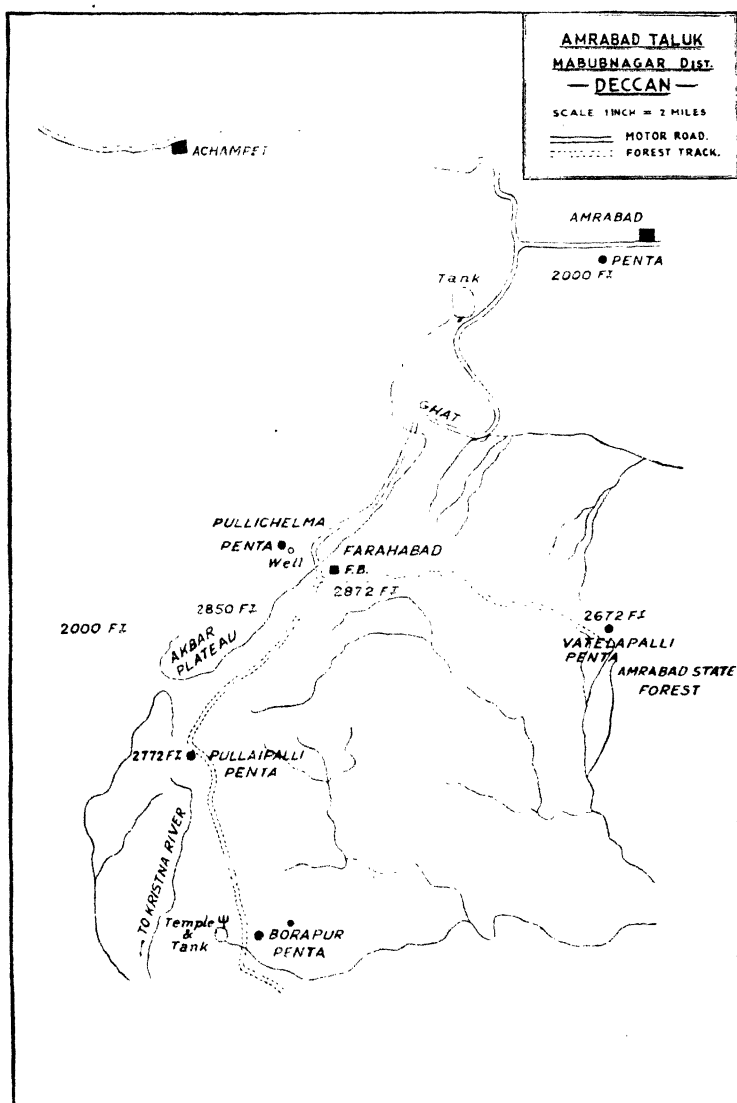


FIG. 1.—Map of five Chenchu Pentas visited in Amrabad Taluk.
[F.B. = Forest Bungalow. From F.B. to Vatelapalli = 6 mls.
From F.B. to Borapur = 12 mls. by forest track.]

Officers of the District that only 200–300 now remain in the area we visited. In the 1931 census 2,000 Chenchus were returned

living in 53 settlements. In the decade before that their numbers had decreased 63% from over 6,000 in 1921. Yaws has now appeared among them from the south and it is doubtful if they will survive another twenty years here. Dr. Baron C. von Fürer-Haimendorf was met in the interior where he was living in a Chenchu settlement with his wife and interpreter engaged in ethnological study. There is another branch of the tribe in the Madras Presidency, south of the Kristna River, in the Nallamalais range. These were visited some years ago by Dr. Baron von Eickstedt (1934) who reported that they were already mixed with 'Melanid' stock.

The Chenchus live in small groups of round basket-work huts with pointed thatched roofs. The settlement is called a *Penta*. Five *pentas* scattered over some 200 square miles of open forest were visited from the Farahabad Forest Bungalow (see map, text fig. 1). Each *penta* consists of eight or ten huts sheltering from 25 to 40 persons. Since blood is not desired from parents and their children in a general survey of a tribe, only about half the population of a village can sometimes be utilized. In small tribal groups like the Chenchus, where inbreeding is naturally pronounced, one child is sometimes tested, when offered, as well as the parents. In fact, everyone is related to everyone else.

A Government vaccinator had been in the area a week before our visit and some Chenchus (particularly those among whom the ethnologist was living) refused to undergo any more pricking. In fact in the interior nearly everyone went away into the jungle upon our approach and were seen no more that day. They are tired of being investigated. The Chenchu men spend every day hunting for food: seeds, fruit, roots and mice, and few can be contacted except early or late. They grub for roots with crude knives and their finger, so that the skin on the latter is more like bark.

A total of just one hundred bloods was obtained from these five settlements and over half of these were from Amrabad at the foot of the ghat where the Chenchus are becoming civilized. At Amrabad the men wear belts and tend herds, while the women work for wages—they were shelling castor beans with small wooden paddles when we went there. Everyone there volunteered to be punctured. In the interior after travelling miles through rough jungle during three days and waiting in the open in a settlement for hours only 46 could be enticed from four *pentas*. Nevertheless, the geographic distribution of the blood groups is interesting (Table I). In Amrabad 27 persons in 50 belonged to Group A and only 8 to Group B. On the plateau 17 out of 25 persons belonged to Group O from the three *pentas* of the interior: Borapur, Pullaipalli and Vatelapalli, and only 3 to Group B. Pullichelma *penta* is now called Farahabad because of its proximity to the Farahabad Forest

TABLE I.

Blood Groups of Chenchus by Pentas.

<i>Penta</i>	Nos. and percentage of persons in Group					Intermarry with
	No.	O	A	B	AB	
1. Farahabad	20	7 35%	6 30%	6 30%	1 5%	1, 2 and 5
2. Vatelipalli	20	4	2	2	2	2, 1, 5. (rarely 3 and 4)
3. Borapur	8	7	0	1	0	3, 4 rarely 2.
4. Pullaipalli	8	7	1	0	0	4, 3 rarely 2.
1st 25 from 2, 3 and 4 (interior)	25	17 68%	3 12%	3 12%	2 8%	chiefly each other.
5. Amrabad	54	12 22%	28 52%	9 17%	5 9%	5, 2 and 1.
All <i>pentas</i>	100	37	37	18	8	

Bungalow. Its male inhabitants work for the Forest Department providing water and fuel. One-third of the inhabitants of Farahabad *penta* were found to be in Group B, which seemed to indicate a mixed stock. The following information was obtained from Dr. Baron von Fürer-Haimendorf in a private communication 'As far as I know the Chenchus at Pullaipalli and Borapur do not intermarry with those near Amrabad, although they intermarry very occasionally with those of Vatelapalli. Those of Vatelapalli, on the other hand, do intermarry to a certain extent with those near Amrabad and also with the people of Farahabad. The latter are a mixed crowd and from them I have heard complaints about Forest Guards seducing their girls. So a high proportion of B is not astonishing here'. Mating habits and blood group distributions of the various *pentas* are shown in Table I. The people near Amrabad and those of the interior would appear to be highly inbred, which is indicated by a preponderance of Groups A and O respectively. Group B seems to be percolating in through miscegenation and it is probable that the Chenchus in their pristine condition, until the area was opened up nearly forty years ago (Khan), belonged almost exclusively to Groups A and O like the Paniyans (Aiyappan) and other pre-Dravidians of the Western Ghats (Macfarlane, 1936). This is a characteristic of many aboriginal stocks throughout the world, but in the peninsula of India it has only been found among the tribes of the southern Western Ghats. The very high percentage of Group A among the Paniyans of Wynaad is probably also the result of inbreeding among the descendants of a few original families. Sarkar has recorded the preponderance of one blood group in one village and of another in others among the Hill Mālér and credits this

distribution to local inbreeding. In his racial distribution map von Eickstedt grouped the Chenchus with the tribes of the southern Western Ghats. The frequencies of the agglutininogen genes also point to some peoples of the Malabar region as most similar to the Chenchus.

The serological value A-B in the Chenchus is +19. The only other communities thus far discovered in India with a preponderance of Group A over Group B are the Paniyans (+52.8), Mixed pre-Dravidians (21), Illuvans (12) and Nairs (13) of Cochin, Malabar Coast.

Guha (1935) found that the coefficient of racial likeness pointed to the Bhils of the Vindhya Hills as the closest relatives of the Chenchus. (Plate 2, Figs. 1 and 2)

BHILS.

There are no blood group data from the Bhils measured by Dr. Guha¹. He reported that some of the communities appeared to be of mixed stock. While in Hyderabad State I visited Kannad Taluk in Aurangabad District in the extreme north-west. Through the good offices of Mr. G. Ahmed Khan and the local revenue officials some Bhils of both sexes were brought into Kannad. Some of them are descended from converts to Islam and now call themselves 'Muslim Bhils'. They intermarry among their own small group. These Bhils are primitive agriculturalists and all appeared to be strong and well built. Only 44 bloods (Table IV) were obtained and 11 of these were from Muslim Bhils. Of the latter 8 were B and the rest Group A, which is indicative of their inbred condition, even in this small lot. In 33 Hindu Bhils the distribution was: Group O 14, Group A 3, Group B 15, Group AB 1. (Pl. 2, Figs. 3 and 4). It seems that these Bhils possess a lot of Groups O and B and perhaps little of Group A. The Pods of Bengal are the only community previously reported to have this type of distribution (Sarkar). The three groups are more or less evenly distributed among the Santals and other aboriginal tribes of eastern India.

As an indication of what we may expect these Bhil data have been included in Table IV. More data are urgently needed from this important tribe. I shall be glad to send mine, with all particulars to anyone who has other blood group data from Bhils.

It may be that in the Bhils we have one of the reservoirs of Group B in India from which it has percolated to higher social castes, for the Bhils have an ancient tradition as soldiers and

¹ The results of blood grouping among the Bhils in the Central Provinces by Dr. Grolitzer working with Rev. Dr. W. Koppers have not yet been published (*Man in India*, 1940: 20: pp. 178-181).

artisans. There were 15,000 Bhils in the hilly parts of north-west Hyderabad State at the last census and the tribe was increasing.

DEPRESSED CLASSES OF THE DECCAN.

The Depressed Classes, sometimes called *Adi-Hindus* or Untouchables, are found everywhere in the plains of India. They are probably the descendants of some aboriginal pre-Dravidian stocks (Dutt). They have been segregated socially to do the meanest types of labour for millenia.

There are always some days on a tour when one is forced 'to halt' and the main object cannot be pursued. When this happened in Hyderabad city and in Aurangabad (350 miles to the north-west) I utilized the time in grouping bloods from the Depressed Classes at dispensaries, hospitals and jails. There is

TABLE II.

Blood Groups of Depressed Classes, Deccan, by Region and Caste.

Sample from	Nos. and percentages in Groups				
	No.	O	A	B	AB
Aurangabad Dist. . .	22	4	5	12	1
Southern half of H. State . .	50	17	9	21	3
		34%	18%	42%	6%
Dhars, Mahars and Mangus . .	50	17	8	21	4
		34%	16%	42%	8%
All Dist. Hyderabad State . .	75	24	14	33	4
		32%	18.7%	44%	5.3%

no difficulty in obtaining them, but they are everywhere regarded as of no interest. Test sera had to be husbanded and I only took bloods from 75 *Adi-Hindus*. These came from all over the State and from several castes, yet the blood group proportions seem to be very similar however the samples are grouped, even by fifties as shown in Table II. The castes represented were: Dher (26), Mahar (16), Mang (5), Dhobi (6), Meta (4), Mala (4), Bhoi (3), Chambhar (2) and a few others contributed one. It is doubtful whether there is any ethnological or genetical difference between most of these and many other of the lowest occupational castes. When tribal life disintegrates many such castes crystallize out as they are now doing from the Marias and Murias of Bastar State (Majumdar).

The blood group proportions among these people in the Deccan are strikingly similar to those of the Depressed Classes of Bengal south of Calcutta, including the Mahishyas, and so are the frequencies of the three genes (see Table IV and Macfarlane, 1938). Dr. Guha's opinion that the basic social stratum

is a fairly homogeneous one over most of India is given support by these data. It is over a thousand miles from Calcutta to Hyderabad, Deccan.

If some Mongolian tribes of Central Asia with a high percentage of Group B are excluded, then the only communities in the extensive list recently published by Boyd in which over 40% of Group B and a frequency for gene B (q) of over 0.300 have been reported are: some of the Gypsies of Hungary and Yugoslavia, some Sundanese of Indonesia, the Moros of Siasi, Philippine Islands, some Ainu of Japan. The Brahmans in one part of the Island of Bali show 42.6% Group B, $q = .288$, in other parts there is less B. The Gypsies are generally believed to have originated in India and some of the others in this list may well have ancient affiliations with this country. If agglutininogen B has spread through the world largely from India as some believe (Bijlmer), then one of the chief sources here seems to have been the ancestors of the present Depressed Classes.

BANJARAS.

At Aurangabad and Hyderabad city a few bloods were also taken from the picturesque Banjaras. The caste is also known as Lambara here (Khan). These were originally a wandering tribe who carried goods by pack animals. The railways have almost ruined this business and many of them are now settling down as cultivators, others still are peddlers. The women's costume is very elaborate, they are weighted down with heavy ornaments and as they tramp the dusty roads they might well be refugee princesses (Pl. 2, Figs. 5 and 6). They are a proud race of hysterical temperament and not easy to approach.

These few data do not resemble so much those from the Gypsies of Europe, whom the Banjaras call to mind, as the Indo-Aryans (Jats and Khattris) of Kashmir and the Punjab. One of them told us that they were related to the Mahwaris. Eickstedt somewhat sweepingly asserted that they are 'extremely hybrid and contain Gondid elements, though of course alongside Indid and Orientalid strains'.

These figures are given (Table IV) in the hope that others may be obtained from this romantic tribe.

MARIA GONDS OF BASTAR.

Jagdalpur the capital of Bastar State was visited next. Here helpful co-operation was extended by the Administrator, Mr. E. S. Hyde, I.C.S., and the Government medical officers.

Transportation was a difficulty and those whom were consulted thought that I might have trouble in the villages. Upon the advice of Mr. W. V. Grigson, I.C.S., I decided to concentrate on the Bison Head Marias also called Dandami

Marias (Grigson). These people are hot tempered and have pronounced homicidal tendencies, hence numbers of them are to be found in the Central Jail, Jagdalpur, serving long sentences for murder, attempted murder, culpable homicide and for causing grievous hurt (Pl. 3, Figs. 1-5). There is also a Yaws clinic in connection with the Maharani's hospital, Jagdalpur, to which many Marias come before the rains. Patients stay for some time and are accompanied by numerous healthy relatives, all of whom are fed free by the Government. I was permitted to take blood samples from prisoners in the jail and from healthy Marias camping at the Yaws clinic (Pl. 3, Fig. 6). Bloods were also taken from a few Bison Head Marias who had come in on their way to work in the tea gardens. I could probably have obtained a total of 200 Maria bloods in another week or ten days if my supply of test sera had not been cut short by accident.

TABLE III.

Blood Groups of B. H. Marias by Region and Crime.

Sample from	Nos. and percentages in Groups				
	No.	O	A	B	AB
Dantewara Tahsil	50	16 32%	11 22%	18 36%	5 10%
Jagdalpur and Sukma	50	13 26%	14 28%	18 36%	5 10%
Murderers, Whole State	50	13 26%	15 30%	19 38%	3 6%
All Bastar State	123	35 28.5%	32 26%	32 34.1%	14 11.4%

A total of 133 Maria bloods was obtained in Jagdalpur. When the names were shown to Mr. Hyde, he advised me that ten prisoners from Antagarh Tahsil in the north, and from Kondagoan Tahsil were not Bison Head Marias. They gave Maria as their caste but had only one name instead of the binomials found among the Bison Head people from further south. These ten may have been Jhoria Murias who are believed to be Hill Marias who have come to the plain (Grigson) and who chose to affiliate themselves with the large Maria group in the jail. Some of the tea garden recruits called themselves Maria-Murias, which merely indicates that they were Marias who claimed social advancement (Grigson). Among these ten Marias from the north-east there were: Group O 4, Group A 4, Group B 2. These data with details will be gladly sent to anyone who collects more from that area. The data from the other 123 Marias have therefore been kept separate (Table III). These latter came from Dantewara District (65), Jagdalpur District

(35), Sukma Zemindari (15), Konta District (5) and Bijapur District (3). Table III shows the percentage of blood groups in some selected samples of 50 or more Bison Head Marias. This tribe seems to be fairly homogeneous for them. All samples are characterized by roughly equal proportions of Groups O, A and B, with a regular small preponderance of B over A.

A similar distribution of the blood groups was found among the Santals of Santal Pergs. (Sarkar) and also among the Mahrattas of Goa (Correia). There are indications therefore that in a wide area across Central India, north of the Deccan, the aboriginal tribes possess all three blood groups in about equal amounts. If the frequencies of the genes (p , q and r) are compared, the Santals have a lower value for p than either the Marias or the Mahrattas.

TABLE IV.

Percentages of Blood Groups and Frequencies of Genes involved.

People	Place	No.	O	A	B	AB	p	q	r	D/ σ
Maria Gonds	Bastar State	123	28.5	26	34.1	11.4	.215	.258	.533	0.3
Chenchus	Mahbubnagar Dist., De.	100	37	37	18	8	.252	.133	.608	0.4
Bhils B. H.	Kannad Dist. Deccan ..	44	31.8	13.6	52.3	2.3	.109	.353	.564	0.0
Banjaras	Hyderabad State ..	43	39.5	21	34.9	4.6	.149	.234	.628	0.4
Depressed Classes	Hyderabad State ..	75	32	18.7	44	5.3	.137	.297	.566	0.02

ACKNOWLEDGMENTS.

This investigation was made possible through a grant-in-aid from the Royal Society, London, and through the generous co-operation of H.E.H. the Nizam's Government and the Government of Bastar State who provided valuable facilities. I am also indebted to Mr. G. Ahmed Khan who ably managed my tour in Hyderabad State and to Mr. E. S. Hyde, I.C.S., for help and advice in Bastar State, as well as to the other officials of districts, forests, jails and hospitals who aided in various ways.

SUMMARY.

1. Blood group data were obtained from the following communities in the Deccan: Banjaras (Lambaras) 43, Bhils 44, Chenchus 100, Depressed Classes 75. In Bastar State bloods from 123 Bison Head Marias and from 10 other Marias were tested.

2. The Banjaras showed a Northern Indian blood group distribution.

3. Bhils near Aurangabad had a very high proportion of Group B (over 50%), perhaps due to inbreeding. They may be one of the reservoirs from which agglutinin B has spread into the Hindu castes.

4. The Chenchus almost all belonged to Groups O and A, except at the place where miscegenation is known to have begun a few years ago. In this they resemble the Hill Tribes of the Western Ghats and the Malayali lower castes, with whom they share the distinction of being the only Indian Tribes to have more of A than of B.

5. The Depressed Classes of the Deccan showed 44% of Group B and frequencies of the three genes similar to that of the Depressed Classes in Bengal.

6. Bison Head Marias possess more or less equal proportions of the three main blood groups with a constant preponderance of Group B.

7. The larger conclusions that should be tested out with bigger samples are: (a) the apparent homogeneity of blood group mixture in the Depressed Classes right across the Deccan and into Bengal, (b) the probable similarity in the blood group proportions among aborigines of Gondwana Land, Behar and Central India across to the northern Western Ghats.

BIBLIOGRAPHY.

- AIYAPPAN, A. (1936). Blood groups of the Pre-Dravidians of the Wynad Plateau. *Curr. Sci.*, 4: 493-4.
- BIJLMER, H. J. T. (1935). The relation of blood groups to race and some particulars of the south-west Pacific. *Journ. Roy. Anth. Inst.* 65: 123-131.
- BOYD, W. C. (1939). Blood Groups. *Tabulae Biologicae* 17: 113-240.
- CORREIA, A. C. de S. (1936). The blood groups in Portuguese India. *Proc. Ind. Acad. Sci.*, 3: 115-119.
- DUTT, N. K. (1931). The Origin and Growth of Caste in India.
- EICKSTEDT, BARON VON. (1934). The position of Mysore in India's racial history. The Mysore Tribes and Castes 1: 3-80. Bangalore.
- GRIGSON, W. V. (1938). The Maria Gonds of Bastar.
- GUHA, B. S. (1933). Anthropological work in the Hyderabad State. *Census of India*, 1931, 23: 277-279.
- (1935). Racial affinities of the peoples of India. *Census of India*, 1931, 1: 1-116.
- KHAN, G. A. (1933). The Chenchus. *Census of India*, 1931, 23: 261-276.
- MAJUMDAR, D. N. (1939). Tribal Cultures and Acculturation. *Proc. 26th Indian Sci. Cong.*, Pt. II: 179-224.
- MACFARLANE, E. W. (1936). Preliminary note on the blood groups of some Cochin castes. *Curr. Sci.*, 4: 653-654.
- (1938). Blood-group distribution in India with special reference to Bengal. *Journ. Genetics* 36: 225-237.
- (1939). Mother and Child combinations of blood groups and blood types and their development in Bengalis. *Journ. Roy. Asiat. Soc. Bengal, Science*: 5: 71-86.
- SARKAR, S. S. (1936-37). Blood grouping investigations in India with special reference to Santal Perganas, Bihar. *Trans. Bose. Inst. Calcutta*, 12: 89-101.

EXPLANATION TO PLATE 2.

- FIG. 1.—Chenchu woman. Australoid type. Farahabad, Deccan.
,, 2.—Chenchu man. Australoid type. Picture appeared in 1931
Census, Vol. 23, as a boy.
,, 3.—Bhil man. Kannad, Deccan.
,, 4.—Profile of 3.
,, 5.—Banjara man. Kannad, Deccan. Ancient Bhil in background.
,, 6.—Banjara women. Aurangabad, Deccan.



FIG. 1. Chenchu woman.



FIG. 5. Banjara man.



FIG. 2. Chenchu man.



FIG. 4. Profile of fig. 3.



FIG. 6. Banjara women.

EXPLANATION TO PLATE 3.

- FIG. 1.—Bison Head Maria, murderer, Jagdalpur. Negroid type, hair not kinky, shaved.
,, 2.—Profile of 1.
,, 3.—Bison Head Maria, murderer, Jagdalpur. Palaeo-Mongoloid type?
,, 4.—Profile of 3.
,, 5.—Bison Head Maria, murderer awaiting trial, Jagdalpur. Gond type. Unusually strong development of facial hair.
,, 6.—Bison Head Maria girl. Australoid type.



FIG. 1. Bison Head Maria.



FIG. 5. Bison Head Maria.



FIG. 4. Profile of fig. 3.



FIG. 6. Bison Head Maria girl.



FIG. 2. Profile of fig. 1.

The Magic Cakras¹ and Rectilinear Orbits in Ancient Astronomy.

By C. P. S. MENON.

(Communicated by Prof. M. N. Saha.)

1. Ever since Aristotle laid it down as an indisputable truth that the circle, having neither beginning nor end was the most perfect figure and, as such, the most fitted by Providence to represent the eternal shapes of the Universe and, in particular, of the celestial orbits, we have been accustomed to astronomical theories attributing to the celestial orbits a circular shape or else a shape closely dependent on the circle², so much so that it looks strange if we were told that at one time there were schools of thought which attributed rectilinear motion to the celestial bodies. We do not even take due notice of the fact that Aristotle and others were refuting such doctrines while asserting the perfection of the circle and its consequent choice by the *Primum Mobile* as the appropriate form for moulding the celestial orbits. Either because these strange beliefs could not stand the searchlight of criticism, or because of their inherent appeal to latent *reality* as distinguished from *appearance*, or more probably due to both these causes, they no longer appear in the fold of the rational sciences, but they seem to have survived in the more favourable atmosphere of astrology and the occultistic and mystic codes. Hence it is but proper to ransack these codes to collect bits of evidence which are likely to throw some light on the old system of belief in rectilinear motion.

A good deal of evidence of the belief as well as of its connection with a square-shaped Universe, with magic *Cakras* and with art and architecture of the ancients has been set forth by the present writer elsewhere.³ The purpose of the present paper is to shed more light on those beliefs and to indicate a closer connection between the magic *Cakras* and the rectilinear

¹ 'C' pronounced as 'ch' in 'chair'.

² Thus the later Greek theories of Eccentrics and Epicycles are still dependent on the circle; while Kepler's ellipse may be broadly regarded as a modification of the circle.

³ *Early Astronomy and Cosmology* (London, 1932—History of Science Library edited by Prof. A. Wolf.) The book also contains plenty of references to other features common to the Hindu, Chinese, Babylonians and other ancient civilizations, such as the *Nakshatras* and the *Sieou* and other divisions of the Zodiac, and their relation to the Square Scheme. See Index *s.v.* Borders, Creatures, Decans, Lunar Mansions, Zodiac (divisions of).

orbits; an attempt is also made to furnish a plausible explanation of these *Cakras* as also of their beliefs in rectilinear motion itself.

2. Before proceeding to deal with these entirely new pieces of information, it is desirable to gather here, in brief, a few of the more important points described in the above book in support of the theory, and a few similar points.

Several of the old Ionian and some Greek philosophers held that the *phenomena* were different from *reality* and they had theories of the latter by means of which they sought to explain the former¹. Xenophanes of Kolophon (born about 570 B.C.) seems to have taught that the motion of the celestial bodies is rectilinear, the apparent circular forms of their daily orbits being only an illusion caused by their great distance from the observer².

Similar references to real orbits as distinct from apparent ones are met with in the *Sūryaprajñapti*, a Jaina astronomical treatise, and in a Chinese work called the *Tcheou-peï*³. These

¹ To quote a few instances:—Anaximander of Miletus (Circa 6th cent. B.C.) held that the sun, moon and stars were each a wheel of fire with a number of holes in the rim, through one or other of which the fire was visible at a given time, the other holes being closed; the eclipses occurring when the vents were all shut up. He arrived at this conclusion by starting from the premise that the first principle (material cause) was the Infinite and arguing that from this was separated 'that which is capable of begetting the hot and the cold', from which arose, in virtue of eternal motion, 'a sort of sphere of flame', and whence in turn were torn off the rings of fire mentioned above. Other philosophers followed in the same way arguing from the premise of a primordial substance and arriving at various conclusions about the shapes of the heavens and the heavenly bodies and their appearances and disappearances (cf. Doxography). Parmenides of Elea (early part of 5th cent. B.C.) maintained that the apparent rotation of the heavens is an illusion, since there is no such thing as *void*, and change and motion cannot be conceived without an empty space; and further that attainment of truth about the phenomenal world was impossible because of the imperfection of our senses (*op. cit.*). Again, regarding the Pythagorean belief in the motion of the earth and a 'counter-earth' round a central fire, Aristotle remarks '.... in this they are not seeking explanations and causes to fit the observed phenomena, but they are rather straining the phenomena in the effort to make them agree with certain explanations and views of their own. Many others might agree with them that the place in the centre should not be assigned to the earth, if they looked for confirmation, not to the observed facts, but to *a priori* arguments' (De Caelo, B 13, 293, A 15-b 30);—e.g. (1) Fire is worthier than earth to occupy the worthiest place, the centre of the heavenly sphere (*loc. cit.*) and (2) 'regarding as they do the number ten as perfect and as embracing the whole nature of numbers, they say that the bodies moving in the heavens are also ten in number, and, as those which we see are only nine, they make the counter-earth the tenth' (Metaphysics A 5, 986a 1).

² Cf. Aetius II, 24. He also held that 'there are many suns and moons according to the regions, divisions and zones of the earth'—cf. the double set of constellations, sun and moon mentioned in the *Sūrya prajñapti* and the *Tcheou-peï* (see below).

³ Cf. Thibaut's article on the *Sūryaprajñapti*—J.A.S.B. Vol. 49, p. 203 seq.; Menon: *Op. cit.*, pp. 28, 91 seq., 162, 167; also *infra*, footnote 2, p. 53.

explain the rising and setting of the stars by their becoming visible at certain distances from us¹. Also, the change of altitude of the mid-day sun throughout the year is explained by giving them a series of daily orbits on a horizontal plane above which become wider from summer solstice to winter solstice and shorter on the backward journey from winter solstice to summer solstice. Though the commentator of the *Sūryaprajñapti* proceeds to give the diameters and circumferences of these orbits, in a later chapter the text assigns a square orbit to the sun; the moon's orbit is yet held to be circular. There is little doubt that this work, and certainly the commentary on it, is a later exposition² of a very early cosmology founded on the square scheme many of whose features are mixed up with later ideas corresponding to a circular or spherical cosmology; this is presumably the reason for assigning the square shape to the orbit of one body and the circular shape to another. The Buddhistic times especially seem to be involved in the transition from the square to the circle. For, a similar transition is found in the shape of Mount *Meru*, the centre

¹ Anaximenes of Miletus held that 'the sun is hidden from sight, not because it goes under the earth, but because it is concealed by the higher parts of the earth, and because the distance from us becomes greater' (Hippolytus Refut. I. 7).

² The *Sūrya-prajñapti*, judged by the general astronomical features of its contents such as the five-year cycle, belongs to the post-vedic and pre-Siddhāntic period of Hindu Astronomy to which also belong the *Jyotiṣha-Vedāṅga*, the *Mahābhārata*, some of the *Purāṇas*, the fragments of *Vṛiddha-Garga*, etc.; this period according to P. C. Sen Gupta is 1400 B.C.—2 A.D. (cf. The Cultural Heritage of India—Ramakrishna Centenary Memorial, Vol. III, p. 347); or to be more conservative, I put it between the 12th cent. B.C. and the 1st cent. A.D.—the upper date being determined by the position of the solstitial colure mentioned in the *Jyotiṣha-Vedāṅga* and other texts (allowing for possible errors), and the lower date by the mention of 2 Śāka (80 A.D.) in the *Pañcāmaha Siddhānta* of Varāhamihira's *Pancha-siddhāntika*. Some features like the double set of constellations and quadrangular *Meru* (vide *infra*) are attributed to *Jina* himself: 'भानि चतुःपञ्चाशत् दावर्कोदयो जिनोक्तं यत्'

(Bhāskara: *Siddhānta Siromani*). According to Jaina tradition represented by a current era, Mahāvira was born about 599 B.C. (cf. Cultural Heritage of India, Vol. I, p. 220); and Gautama Buddha, the junior contemporary, passed away about 485 B.C. Hence I consider that most of the characteristics of the text must have been formed and gathered together by about 500 B.C. It is quite possible, and even probable, that the Māgadhi text itself was composed or systematized in the present form as one of the Jaina secondary canons only in the 1st cent. A.D.; the Sanskrit commentary by Malayagiri is much later indeed. The astronomical features of the text are certainly very remote from those of the later and more scientific Siddhāntas of the period beginning with Āryabhaṭṭa (499 A.D.).

Tcheou-pei is one of the oldest Chinese mathematical texts, written at least as early as 1100 B.C., though some of the portions dealing with cosmology are regarded as later (2nd cent. B.C.); in the latter case, the scheme may have been imported by Buddhist missionaries from India (Menon: *op. cit.*, p. 92; Thibaut—J.A.S.B. Vol. 49).

of celestial motion in the above system: while its cross-section was regarded as 'quadrangular, not round' in 'the book of *Jina* i.e. of the Buddha,'¹ the Buddhists are reputed to have believed that Meru 'is square at the base, round at the top'.² The same transition from the square to the circle must have been the reason for the confusion in the minds of the priests of the *Brāhmaṇa* period, whether altars to be constructed for certain ceremonies should be in the shape of a square or a circle.³

The dimensions of the daily orbits of the sun and the height of the plane on which they lie, as seen from the 'extremity of the earth' (*Jambudvīpa*), which are detailed in the *Sūrya-prajñapti* appeared to be no more than absurd fancies of theologists. Indeed, they led to absurd results, when the orbits were taken as circular. For instance, since the distance between the two solstitial orbits must subtend at the observer an angle equal to twice the obliquity of the ecliptic ($= 2\omega$), the position of the observer is given by the intersection of a segment of a circle standing on a chord $= 510$ *yojanas* and containing an angle 2ω with a line drawn parallel to the chord at a distance of 800 *yojanas*. But actual drawing shows that the line does not meet the circle at all—tending to show that the figures were fictitious. On the other hand, assuming the orbits to be squares and the solstices to be represented by the corners⁴, one could show that the given dimensions not only yield a possible value of the latitude ($= 6^{\circ}18'$), but also an appreciably correct value of the obliquity. $6^{\circ}18'$ is obviously an appropriate value for the latitude of the end of *Jambudvīpa*, the southernmost point of Ceylon (Dundra Head) being now at a lat. of $5^{\circ}56'N$. This treatment gave sense also to another set of measurements described as observed from 'us'; the latitude of this 'our' place was obtained as $29^{\circ}39'$, which roughly corresponds to *Hastinapura* of *Mahābhārata* fame, where flourished a great civilization and great astronomers like *Vṛiddha-Garga* and *Parāśara*. Astronomers from this place evidently observed the changes of altitude of the sun here, and also proceeded to Ceylon to make further measurements, so as to deduce the dimensions of the orbits. Having calculated the distance between the solstitial orbits assumed to lie on a horizontal plane 800 *yojanas* above the end of *Jambudvīpa*, and then with the idea that the solstices correspond to the corners of the squares, reducing the distance to a difference between the *sides* of the orbits and of *Jambudvīpa* (also conceived as a square),

¹ Cf. Al Biruni's *India*, page 243; several *purāṇas* also make Meru square. Cf. Menon, *op. cit.*, p. 87 *et seq.*

² Cf. Al Biruni, *op. cit.*

³ Menon, *op. cit.*, p. 74; there are several passages in the *Brāhmaṇas* to this effect.

⁴ These assumptions are warranted by a large mass of evidence; cf. Menon, *op. cit.* Index *s. v.* Corners (sanctity of).

and further assuming a round number 100,000 yojanas for the side of *Jambudvīpa*, they seem to have arrived at the numbers given in the text. Thus what appeared to be absurd on the hypothesis of circular orbits is at once seen to be perfectly sensible and to yield remarkably accurate and appropriate results on the hypothesis of square orbits.

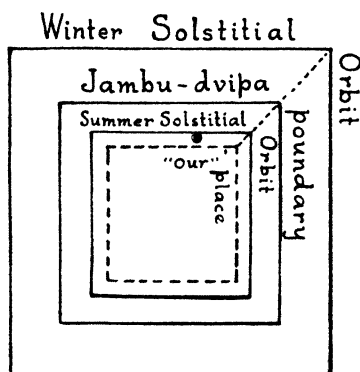


Fig. 1

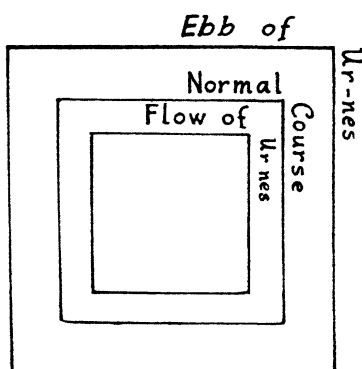




Fig. 2

(Ab = 180 yoj. bc = 330 yoj.
Ad = 40. Ac = $510\sqrt{2}$ yoj.)

3. A similar set of orbits (see Fig. 2) seems to be implied in the descriptions of certain cosmological conceptions of ancient Egypt. The Universe was a sort of rectangular box supported by four pillars at the cardinal points, which were connected by a chain of mountains. On a ledge somewhat below the top of these the celestial river *Ur-nes* flowed round the earth, carrying the bark of the Sun. During the course of the year, the *Ur-nes* ebbs and flows, the Sun's boat always keeping to the bank nearest to man; at summer solstice the river (like the Nile) overflows, so that the Sun's orbit is nearest to man and his altitude highest; whilst at winter-solstice the river ebbs causing the boat's path to be farthest from man and making the Sun's altitude least. There are also references to the *Ur-nes* turning *sharply* round at the southern point. The similarity of Fig. 2 to Fig. 1 is evident.

4. Apart from these daily orbits, the annual motion was represented by means of divisions of a square enclosure, and it is very probable that the zodiac itself was conceived as a square rather than a circular enclosure. In India one is familiar with the *Rāśi Cakra*, the square with its twelve small squares round the edges, which is used by the astrologer to represent the positions of the celestial bodies at any given time. The solstices and equinoxes were intimately connected with the corners of the square, as though the zodiac was actually conceived as a

square. There were other enclosures, like the horizon, which were also conceived as square (*caturanthā*)¹. The Babylonian symbol for 'enclosure' is traceable to the primitive *Hal* symbol , which is just a square²; the ecliptic was called *kes-da*, 'the enclosure'³. Several of these rectangular enclosures are found on Babylonian boundary stones, cylinders and seals in conjunction with animals of the early zodiac or other objects of definitely astronomical import.⁴ The Chinese symbol for

the earth was , a quadripartition of the square⁵. The

Babylonian *Hal* symbol was also applied to *Zikum*, heaven; and again to *Apsu*, the Great Deep, wherein was rooted the world-tree which spread its branches into *Zikum*. Thus the rectilinear orbit appears as part of a square-based earth and a square-based Universe; and much of ancient symbolism and culture was bound up with the square form.

5. 'Astrological conceptions.' The following extracts from an article in the *Encyclopædia of Religion and Ethics*⁶ are worth quoting as further evidence confirming the theory of the ancient conceptions of rectilinear orbits and Universe and their symbolism and practical manifestations. After referring to the division of the zodiac and to the corresponding division of the observer's celestial equator 'into 12 apparently stationary parts', and showing how these parts called 'houses'⁷ are connected with the horizontal directions, the writer says:

'This method of parcelling out the sun's apparent daily course must have been instituted at a very remote period, in an age indeed when the astronomer had not yet grasped the idea of a circular orbit, but still thought of the solar path as a square.⁸ In the figure representing the horoscope⁹ this quadrature form was retained, and it has remained in use till modern times, and in fact till the present day. To this method of delineating the stellar paths we shall frequently have to return, as a considerable number of symbols relating to God and the world were evolved therefrom.'

'The astrological conception of the world' is defended thus: '..... It is impossible to understand the theories of nature held by the ancients without a clear conception of the

¹ Cf. Monier Williams' *Sanskrit Dictionary*.

² *Babylonian and Oriental Record*, Vol. II, p. 258.

³ Brown: *Primitive Constellations*, Vol. II, ch. XI.

⁴ Menon, *op. cit.*, pp. 121-125.

⁵ Cf. D'Alviella; *Migration of Symbols*.

⁶ Vol. 12, pp. 54-56—article on 'Sun, Moon and Stars' by F. von Oefele.

⁷ Cf. Menon, *op. cit.* Index s. v. Houses.

⁸ Italics ours.

⁹ See Fig. 3. The original square houses must have given place to triangles later; cf. Menon, *op. cit.*, pp. 73, 140.

difference between their fundamental stand-point and our own. According to the older view of the world which can be traced

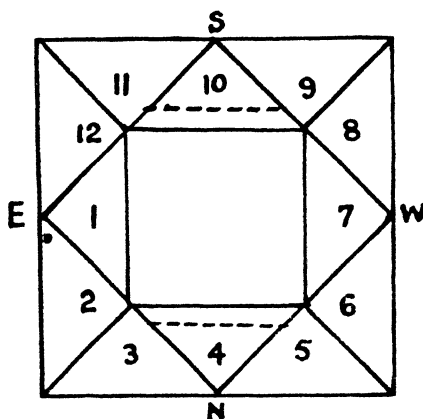


Fig. 3.

backwards for 5000 years before Christ, all natural objects issued in parallel lines from certain primary causes of universal operation. Modern Science, on the other hand, assumes that the various groups of physical phenomena proceed by differentiation from certain primordial forms

He again refers to 'the square form of the horoscope, as furnishing the ground-plan' of this theory of the world, and as showing the link which the theory had with astrology and also with two other occult sciences, Alchemy and the Kabbala. He points out 'that the symbols used in astrology for the four cardinal points were simply the triangles corresponding to the first, fourth, seventh and tenth houses respectively ¹. Δ came to mean north, ∇ south, \triangleright east and \triangleleft west.'

'The tenth house, as the *summum coelum*, and the fourth, as the *immm coelum*, embraced everything in the world above and the world below respectively. The upper world as a whole, however, consists of the eighth, ninth, tenth, eleventh and twelfth houses. In the hieroglyph script of Egypt, accordingly, heaven is represented by the exterior boundary of the five

houses, thus :  . . . The underworld was represented of

course by the same figure inverted According to one

¹ These symbols are just opposite to the plan given above; the incongruity is treated by the writer as due to the determination of the stars of the ecliptic by an observer in the north and the fixing of the cardinal points by his fellow in the south! But they agree with the orientation of the world described in our book.

conception, the *summum coelum* contains the heavenly upper ocean¹, from which rain falls, while the *immum coelum* contains both the ocean of the underworld and the sub-terrestrial waters from which the fountains of the deep² are fed. According to the other conception there lies above us first of all air, then fire; and beneath us, first earth, then water.'

The later theory furnished the alchemists' symbols of the elements: Δ Fire. \triangle Air, ∇ Earth and ∇ Water. These

symbols were used commonly by old physicians a hundred years ago; and sometimes in combination, e.g. \star denoted 'burnt water' or distilled alcoholic liquors. The last symbol 'was used not only in alchemy but also in the Kabbala, where it represented a star of David. It became, in fact, a symbol for God' (Heaven being regarded as a synthesis of Fire and Water).

According to the astrological conception of the world, 'not only the perpendicular section through the universe, but the surface of the earth itself was thought of as a quadrate, since the cube, as the ideal geometrical figure, was the accepted symbol of the world as a whole. This idea finds frequent expression even in later cabalistic writings treating of the origin of salt, which, of course, also crystallizes in cubes. The scheme of the horoscope accordingly became a comprehensive map of the world as well'.

6. *A mural picture of the Universe.* In a picture on a templewall³ depicting the *Brahmāṇḍa*, the cosmic-egg, the Sun is shown at the centre, the orbits of Mercury and Venus are shown as a pentagram (five-pointed star) and a (convex) pentagon respectively and Earth is in the ecliptic. Though this picture was painted at a comparatively recent date, there are several features in the scheme typical of the *Siddhāntas* and a few characteristic of the *Purāṇas* and the early rectilinear cosmology. It is presumably a mixture of several conceptions, ancient and later. The following is a translation of the relevant parts of the description accompanying the chart:

'At the centre of the Universe (Anḍa-kaṭāha) is the Sun. Nearest this Light of the World-theatre, the Sun, circum-ambulates Mercury five-corneredly; beyond this Venus also in a pentagon; and still beyond this the earth revolves like a ball.

¹ Cf. Biblical allusions in Menon, *op. cit.*, p. 23.

² Cf. Babylonian *Apsu*.

³ Wall of the *Śiva Temple at Tripālur* (a village 12 miles off Palghat in the West Coast of S. India). The picture is accompanied by an inscription in Malayalam, describing the details; it appears to have been finished on May 9, 1846, by one Vasudevar, disciple of Maha Yogishwara-swami, a sage 'who dwells in the Sahya mountains, in Amalākakshetra, on Brahmagiri hill, in a sacred cave'. I am indebted to Mr. P. R. Chidambara Iyer of the Kodaikanal Observatory for bringing the above account to my notice.

All planets turn round their naves and travel like waves, so that rising and setting are observed. The moon alone revolves round the earth. Mars revolves beyond; Jupiter turns beyond in his own orbit with one loop per sign (Rasi). Beyond Saturn revolves with three loops per sign. *Rahu* and *Ketu* are latent in this. Above Saturn is the orbit of the Great Bear (*saptarshi kakshi*); above this is the orbit of the 27 Nakshatras, above this is the orb of the Pole-star.¹

Then follow measures of the diameters of the globes and orbits of the Sun and the planets with particulars of the 'Winds' that blow them along in their orbits; and then a description of the 18 'Worlds' composing the cosmic-egg, of which Earth answers for 9 worlds, the world of Heaven includes the above 11 orbits, and there are eights beyond, ending with *Vaikuntha* on the wall of this egg.

There are several peculiarities in this account. The postulation of several kinds of winds (Vāyu) as the agents causing the motion of the celestial bodies, the wave-like motion for the planets, and the mention of loops for Jupiter and Saturn are features of Hindu astronomy of the period of the Siddhāntas or earlier¹, rather than of the west. The rotation of the bodies including the earth and the place of the Sun at the centre are characteristic of western astronomy, though Aristarchos of Samos (3rd cent. B.C.) held the latter doctrine. But loops are not necessary in a heliocentric system; and though the earth is shown on the ecliptic, the writer gives the dimensions, not of the 'earth's orbit' but rather of the 'Sun's orbit'—which show that but for a superficial exchange of positions between the Sun and the Earth imposed later, the system is left intact in an early form. The division of the Universe into several worlds and the attribution of rectilinear orbits to two planets indeed indicate the very early origin of the system.

7. *The Orbit of Mercury.* It seems curious that the orbit of Mercury should have been supposed to be a five-pointed star; this figure was regarded by the Pythagoreans as endowed with mystical and occult qualities, and it was also employed in magic (cf. its name 'Wizard's Foot'). It is worth while trying to put oneself in the position of the early astronomer and explaining the phenomena with this orbit in view.

The main facts are:—(i) They would have observed that Mercury was never far off from the sun's direction, i.e. it oscillated round the line of sight to the Sun as a mean position, the maximum elongation (x) from the Sun being about 20° and the period being about 80 days.² (ii) They believed that Mercury

¹ 500 A.D. onwards. The 'motor' winds are described also in the Purāṇas (cf. Matsya-purāṇa 127, 12-17); these and the *vakra* and *anuvakra* motions were known to the Siddhāntas of the *Panchasidhāntika*.

² I.e. approximately. The modern figures are: x varies between 18° and 28° and period = 88 days.

moved along straight lines. From these two facts it would follow that during one of the stages of its journey, Mercury traces a line at right angles to the line of sight (say, from left to right) the extreme diections making x° on either side of this line of sight; according to a crude manner of reckoning, the line of sight has to be stationary all this time. Then the planet retrogrades, i.e. moves from right to left; the line of sight in the meantime has moved through $2x$, and it will now be at right angles to the new path. For this orbit $2x = 36^\circ$, so that $x = 18^\circ$, i.e. the elongation of the planet was supposed to be 18° , which is near enough to the correct value.

We may understand the argument more graphically by reference to Fig. 5, in which the pentagonal orbit is derived by reducing the motion of Mercury round the Sun in a second circle¹ to rectilinear motion. (i) An observer standing at O and facing the direction OO_1 sees the planet retrograding from A to B, where $\angle AOO_1 = \angle O_1OB = 18^\circ$; instead of the minor arc AB of the circle he believes that the planet traces the rectilinear path AHB at right angles to the line of sight OO_1 from left to right. And as the body continues its path on the circle and enters the major arc, it appears to reverse its direction and proceed from right to left. But by the time the planet has finished its retrogression, i.e. in 36 days (suppose), O_1 has gone forward to O_2 where $\angle O_1OO_2 = 36^\circ$, and the point B of the circle centre O_1 now occupies the position A on circle centre O_2 ; the right to left motion of the planet therefore starts from A and proceeds along AC at right angles to the line of sight OO_2 . When this is finished, OO_2 would have moved on to the position OO_3 ; the motion now is along the minor arc DC and appears to be retrograde along the chord DC at right angles to the new line of sight OO_3 . The planet would then appear to move along DE and then along FE and so on. (ii) These bits of path AB, AC, DC etc. are disjointed, because of the alternating retrogression and progression. The astronomer could have of course known that the planet was not jumping across from B to A, etc., but was describing a continuous path. The obvious thing to do was to draw the 'map' of its motion on the ground or on a plank. This is obtained by drawing PQ in the direction of AB and equal to it; then QR in the direction of AC and equal to it; then $RS \parallel DC$; $ST \parallel DE$; and $TP \parallel FE$. This closes the circuit, and one obtains the five-pointed star PQRST for the orbit of Mercury.²

¹ I do not intend this to mean that the ancient astronomer actually supplied this "epicycle" as well as the rectilinear orbit. I have supplied the circle so that we may easily picture the argument.

² The same thing may be seen easily, if we suppose the Sun to be at O, and the observer at O_1, O_2 , etc., on a revolving earth, moving through stages of 36° in separate periods of 36 days. Then he would see Mercury going along PQ, QR, etc., perpendicular to the lines of sight O_1O, O_2O .

8. *The orbit of Venus.* If we attempted to explain the orbit of Venus in the same way, we find that one of the sides of the pentagon (say) a line of progression has to turn through an angle of 72° , when changing into the next side or line of retrogression, which means that the line of sight which is at right angles to the path must turn through $(180^\circ - 72^\circ)$ or 108° in the meantime. Therefore Venus was supposed to have a maximum elongation of 54° on either side of the line of sight to the Sun

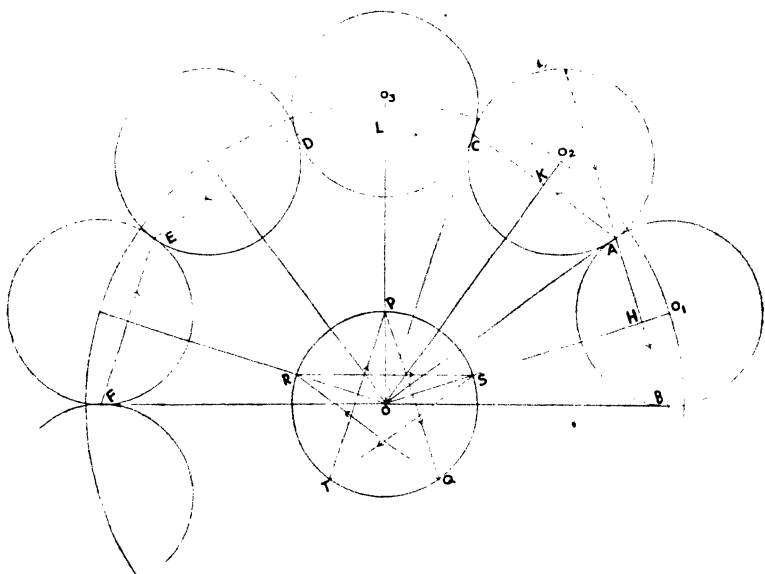


Fig. 5.

which turns through 108° in approximately 108 days, so that the period of Venus round the circle = 216 days.¹ This is near enough to the modern figure of 225 days. Neglecting any difference between these numbers and observed values as due to errors of observation², they might have argued as before and obtained the convex pentagon as the orbit of Venus.

9. *Other Cakras.* The above explanation of the orbits of Mercury and Venus lead us to attempt explanations of the other *Cakras* on the same lines.

¹ More accurately the period is $2 \times \frac{198}{360} \times 365\frac{1}{4}$ days = 219 $\frac{1}{2}$ days.

² There is nothing strange about this. Do we not do exactly the same thing when we neglect awkward decimals derived from observations and adopt simple numbers for our Laws, as for instance in the Inverse Square Law?

(i) The *Rāśi Cakra*¹ or the wheel of signs is, as stated in section 4, connected with the divisions of a square and the solar zodiac. The Ecliptic or the 'Year-cycle' of the Aryans, the Babylonian Furrow-of-heaven, was pre-eminently the orbit

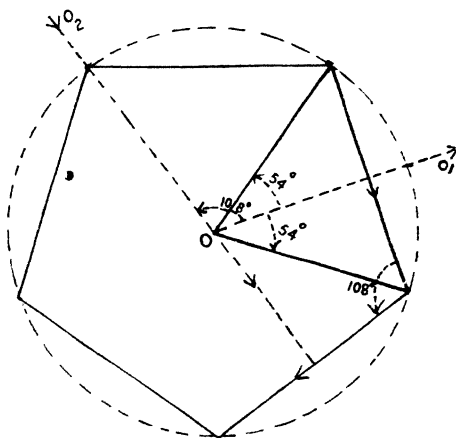


Fig. 6.

of the Sun. And it has been indicated above how this was represented by a square, and was probably regarded as a square. An explanation of the square orbit of the sun would be this:—

The Sun first travels along AB and then turns to BC; the line of sight turning through 90° . The motion of the Sun would then appear as an oscillation of 45° on either side of the

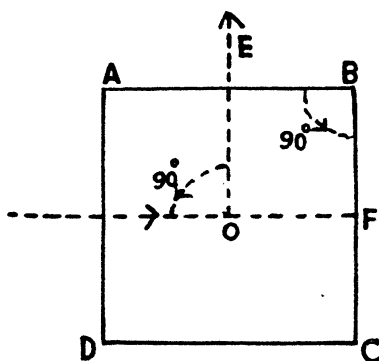


Fig. 7.

line of sight; this would be the case in places where the Sun rose N.E. at summer-solstice and S.E. at winter-solstice.

¹ Cf. Menon, *op. cit.*, p. 66 et seq., 156 seq.

(ii) The *Rāhu Cakra* or the eight-pointed star is another important *Cakra* in astrology and magic. It is connected with the 'eight planets' (Sun, Moon and Rāhu being included amongst the planets) and especially with Rahu. The *Atharva-Veda* mentions Rāhu as a planet causing the eclipses; it was identified in later Hindu astronomy with the moon's ascending node; in mythology Rāhu was the head of the Demon or Serpent who swallowed the Sun and Moon during eclipses. *Rāhu Cakra* would thus appear to be connected with the motion of the moon's node. Whether it is concerned with the moon's node or not, if we argue as above, we see that Rāhu must have been imagined as travelling along AD and then turning through 135° , along DG. During a period of progression or retrogression, the line of sight turns through $180^\circ - 135^\circ = 45^\circ$; so that Rāhu oscillates through $22\frac{1}{2}^\circ$ on either side of a mean line; what was this mean line and what was the period of the oscillation it is hardly possible to conjecture.

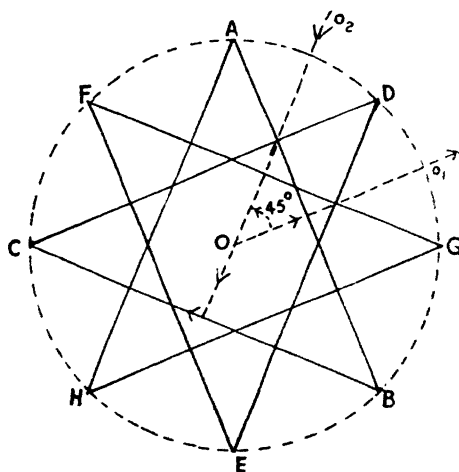


Fig. 8.

(iii) There are also other *Cakras* like the *Kurma-Cakra*, or the Tortoise-wheel which is a 27-pointed star, and the *Śrī-Cakra*, the wheel of Lady Fortune, which is a 64-pointed star. A 27-pointed 'star' can be inscribed in a circle in four ways, two of which are illustrated here (see Fig. 9); the other two are obtained by continuously joining every two points separated by intervals of 10 points or 11 points. It is not certain which of these was drawn in early days, and so it is futile to attempt any explanation here. Al Biruni connects it with 27 *nakshatras*, but he gives no diagram. The 64-pointed star is identified with the Ecliptic and is used very much in magic.

10. *Shadow-measurement.* One is intrigued by the question why the ancient astronomer should have believed that the celestial bodies *actually moved* in straight lines. It is easier to understand the reason for their *representing* the motion by the square enclosure and its divisions. Now there is another practice of the ancient astronomers which seems to have gone hand in hand with the idea of rectilinear orbits, viz. their observation of the Sun by measuring the shadow cast on the ground. The connections of the square and its divisions or square borders

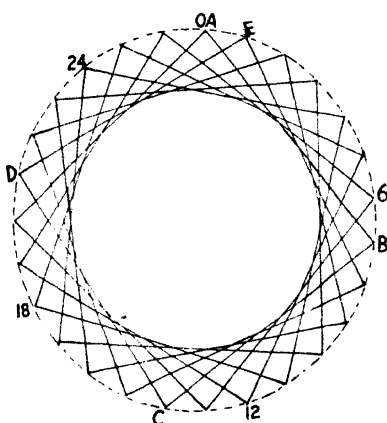


Fig. 9(a)

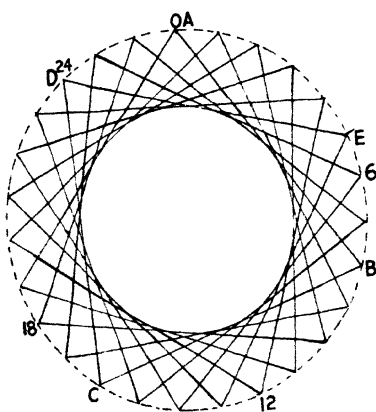


Fig. 9(b)

with (i) the gnomon which was used for measuring shadows¹; (ii) with the Hindu myth of *Samjñā*, mistress of *C-hāyā* (shadow), and wife of *Sūrya*² (the Sun) and (iii) with the Biblical allusion to the shadow going back 10 *ma'aloṭh* (divisions or steps) on the dial of Ahaz and coming up again by an equal amount at the behest of Isaiah³, have been explained by the present writer. The *Tcheou-pei*, which contained a description of a cosmology similar to that in the *Sūryaprajñapti*, gives measurements of the mid-day shadow on the longest and the shortest days of the year. So it is quite possible that they might have conceived of rectilinear paths by looking at the shadows.

The path of the tip of the equinoctial shadow of a vertical style on the ground is everywhere a straight line, viz. the line where a plane through the top of the style parallel to the celestial equator meets the horizontal plane. This can be proved by equations also.

Let Z, P, S be the zenith, pole and the Sun at any time. Let λ, δ, H, a be the latitude of the place, declination of the star,

¹ Menon, *op. cit.*, pages 44-46, 146, 147.

² *Ibid.*, pp. 146-147.

³ *Ibid.*, pp. 149-150.

altitude and azimuth (measured for convenience on either side of the South meridian). Let H_0 be the meridian altitude on that day.

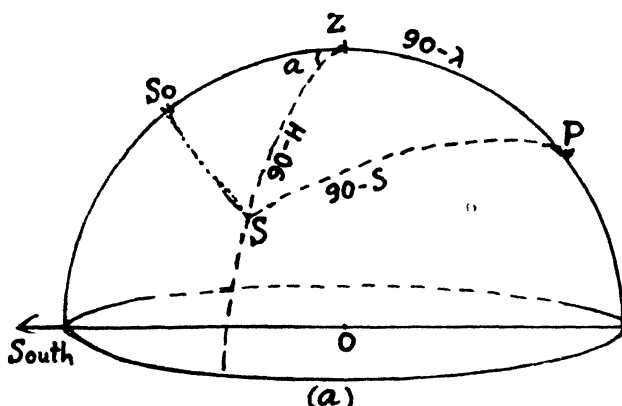


Fig. 10(a)

Then from spherical triangle ZSP.

$$\sin \delta = \sin H \sin \lambda - \cos H \cos \lambda \cos a \quad \dots (1)$$

When $H = H_0$,

$$\sin \delta = \sin H_0 \sin \lambda - \cos H_0 \cos \lambda \quad \dots (2)$$

Eliminating $\sin \delta$ between (1) and (2) we get an equation connecting H and $\cos a$ for the day.

On the equinoctial day, $\delta = 0$. Therefore (1) and (2) give

$$\cos a = \tan H \tan \lambda \quad \dots (3)$$

$$1 = \tan H_0 \tan \lambda \quad \dots (4)$$

$$\text{Therefore } \cot H \cos a = \tan \lambda = \cot H_0 \quad \dots (5)$$

Now, if p be the length of the style casting shadows,

$$\text{the shadow at Noon} = OA = p \cot H_0 \quad \dots (6)$$

and the shadow at $S = OQ = p \cot H$.

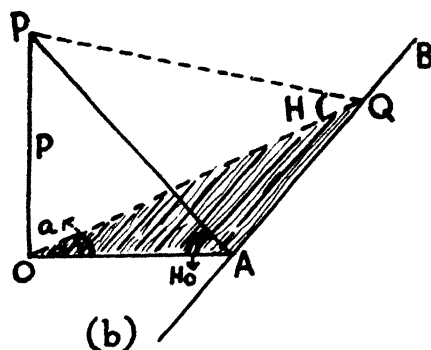


Fig. 10(b)

$$= \frac{p \cot H_0}{\cos a} \quad \dots \quad \dots \text{by (5)}$$

$$\frac{OA}{\cos a} \quad \dots \quad \dots \text{by (6)}$$

But a is the angle QOA .

Therefore Q lies on AB drawn \perp OA at A on the ground.

Thus the locus of the end of the shadow is a straight line.

This phenomenon is too striking to have escaped the notice of the shadow-measurers. They would also have noticed that for some time immediately after sun-rise¹, the top of the pole does not cast any shadow at all, and then the shadow begins to appear at a certain distance. From this they must have concluded that celestial bodies move in rectilinear orbits, and appear to us only when they come within a certain distance.

CONCLUSION.

11. Thus it would appear that the ancient astronomers who were engaged in observing the Sun and the stars and measuring the shadows learnt to assign rectilinear orbits to the celestial bodies. This fitted in with their system of measurements based on square scales, and with their general scheme of things including their conceptions like the Universe based on the square form and their appliances like the gnomon and the Sun-dial of Ahaz. From an evolutionary stand-point the square appears to have given place to the circle, the intermediate stages being marked by the pentagon, hexagon, octagon, etc.² While the solar orbit and the zodiac—the path of all the planets—was conceived as a square in the beginning, they soon began to differentiate the forms of the orbits of the planets: the pentagram and the pentagon were assigned to the orbits of Mercury and Venus, the eight-pointed star for Rāhu, and other stars for other entities; these were the polygons which formed the Ideal fits to the respective orbits, any variations in observed values being treated as approximations or mere appearances. These 'realities' or secrets of the Universe were treasured as secrets and gave rise to various symbols of mysticism, occultism and art, and survived in astrology, alchemy, the Kabbala, and in rites of religion and magic.

¹ I.e., till the Sun comes up to the height of the pole.

² Cf. Menon, *op. cit.*, pp. 49-50, 69, 74, 89, 167.

Observations on two Myxosporidians *Zschokkella lissemysi* N.Sp. from the gall-bladder of the tortoise, *Lissemys punctata* and *Zschokkella auerbachii* (Weill) from the gall-bladder of *Bufo melanostictus*, with a note on the Genus *Zschokkella* Auerbach.

By MUKUNDAMURARI CHAKRAVARTY.

(Communicated by Dr. K. Biswas.)

INTRODUCTION.

In the course of examination of the gall-bladder of the tortoise *Lissemys punctata* caught from the tank of our college compound, I came across a new species of *Zschokkella*, *Z. lissemysi* which is described in this paper. I have also given here a detailed description of *Zschokkella auerbachii* (Weill). A discussion on the genus *Zschokkella* has also been attempted here.

The methods of preparation adopted here are the same as given by the author (1939) in his previous paper. The spores were studied and their measurements taken in fresh conditions. Permanent preparations were also made in order to study the different developmental stages of the parasites.

I am indebted to Dr. H. N. Ray for his helpful suggestions and for the slides which he prepared and placed at my disposal for further investigation. Thanks are due to Mr. D. Mukerji and Mr. J. L. Bhaduri who helped me in various ways. Thanks are also due to Mr. P. L. Misra of Lucknow University for sending me some slides which he prepared from the gall-bladder of *Rana limnocharis* found at Mukteswar (U.P.).

Genus *Zschokkella* Auerbach 1910.

Since there is a considerable difference of opinion as to the proper use of the generic names *Cystodiscus* and *Zschokkella* a brief account of these genera as given by previous authors is given here. The genera *Cystodiscus* and *Zschokkella* were established by Lutz (1889) and Auerbach (1910) respectively to receive the type species *C. immersus* and *Z. hildae*. Cordero (1919) who re-examined *C. immersus* was of opinion that its spores resemble those of the genus *Myxidium*. Thus according to him *Cystodiscus* becomes a synonym of *Myxidium*. Weill (1929), however, ignoring the observations of Cordero pointed out that the characters of the spores of the genera *Cystodiscus* and *Zschokkella* resemble one another so much that he revived the genus *Cystodiscus* and merged Auerbach's genus *Zschokkella*

in it but curiously enough he admitted that the latter is well defined. In his revision of the myxosporidian genera Kudo (1933), especially on the strength of Cordero's observations, included *C. immersus* in the genus *Myxidium* abolishing the genus *Cystodiscus* and retained *Zschokkella* as a distinct genus.

I am in entire agreement with Kudo's classification but the definition of the genus *Zschokkella* needs a little emendation especially in reference to the characteristics of the spores. In the definition it is stated that the ends of the spores are pointed but on referring to some species of *Zschokkella* so far described it has been found that they are rounded as in *Z. ovata* (Dunkerly) 1921, *Z. rovigneensis* Nemecek 1922, *Z. parasituri* Fujita 1927 and *Z. auerbachii* (Weill) 1929. The new species described in this paper also reveals rounded extremities of the spores. I therefore propose the following definition for the genus.

Genus *Zschokkella* Auerbach 1910 emend. Spore semicircular in front view; ellipsoidal in profile. Ends pointed or rounded. Sutural line curved. Polar capsules large and spherical; polar filaments long and fine. Typically coelozoic in marine or fresh-water fish and also in amphibians and reptilians.

Zschokkella lissemysi n.sp.

Host:—*Lissemys punctata* (Bonnaterre).

Habitat:—Gall-bladder.

Locality:—Calcutta.

Vegetative form:—In the stained preparations of the contents of the gall-bladder of the host a large number of amoeboid uninucleate forms (Pl. 4, figs. 1 and 2) were encountered. The cytoplasm of these young trophozoites is vacuolar and no distinction could be made between the ectoplasm and endoplasm. The nucleus is spherical with a centrally placed karyosome and measures about 2μ in diameter. The young trophozoites measure $12.36-14.42\mu$ in length and $8.24-9.33\mu$ in their broadest part. Mature or sporulating trophozoites were unfortunately not seen.

Spore: In front view, the spores appear semicircular (Pl. 4, fig. 3) with one of their ends slightly tapering and so they sometimes appear egg-shaped. In the lateral view they are ovoidal (Pl. 4, fig. 4). On the flat surface of the spore and in between the polar capsules there is a lid (Pl. 4, fig. 3), which, when open, in all probability allows the sporoplasm to flow out. The valves of the spore are thick and striated, the striae being parallel. The sutural line and ridge could not be seen. The polar capsules are equal and spherical. The coiled filament of the capsules can easily be seen in fresh condition. Each capsule is provided with a fine duct (Pl. 4, fig. 3) which opens to the exterior by the side of the lid. The filament is extruded through this duct. The sporoplasm occupies the entire space of the spore between the polar capsules and in front view extends dorsally

like an umbrella over the capsules. It is clearly visible both in fresh and stained conditions. In stained preparations two nuclei of the sporoplasm are found (Pl. 4, fig. 5). Besides, two capsulogenous nuclei are attached to the two capsules.

Dimensions: length of the spore $18.5-22.6\mu$, breadth of the spore $14.4-16.4\mu$, polar capsules $7.2-9.2\mu$ in diameter, spore wall 2.06μ thick, polar filament 100μ in length.

Affinity.

Of all the species of *Zschokkella* so far known only one has been reported from the gall-bladder of Amphibia and the rest from the gall-bladder or urinary bladder or kidney of fishes. It is for the first time that *Z. lissemysi* is reported from the gall-bladder of a reptile. Its spores differ from those of all the known species of *Zschokkella* in the position of the polar capsules and in having a lid on the ventral wall of the spore by the sides of which the two ducts of the capsules open to the exterior. The spores of *Z. lissemysi* approach to those of *Z. hildae* Auerbach, and *Z. salvelini* Fantham, Porter and Richardson in size but differ in shape and in having rounded extremities. *Z. rovigensis* Nemecek has spores equal in size with those of the parasite under report but differs in having one of the ends of the spores narrower than the other and in the presence of striations on the valves of the shell.

Zschokkella auerbachii (Weill).

Syn: *Cystodiscus auerbachii* Weill, 1929.

Zschokkella prasadi Ray, 1933a.

Cystodiscus sp. Ray, 1933.

Zschokkella auerbachii (Weill) was described in 1929 from the gall-bladder of *Bufo melanostictus* of the Indo-Chinese region. Ray (1933a) reported *Zschokkella prasadi* from the gall-bladder of *Bufo melanostictus* and *Rana tigrina* occurring in Calcutta but he published no description of the species. In the course of examination of the same hosts from the same locality as Ray (1933a) did, a species of *Zschokkella* was also observed by me to inhabit their gall-bladder. Ray very kindly handed over to me for further investigation the slides which he prepared and on comparing his preparations with those prepared by me, I find that these myxosporidians belong to the same species, as the shape and size of the spores as well as of the vegetative forms are exactly alike. Moreover the spores of the *Zschokkella* under report resemble very closely to those of *Z. auerbachii* (Weill) both in shape and size, although the size of the vegetative forms differs to a considerable extent. Thus, as the classification of myxosporidians are chiefly based on the characters of the spores, *Z. prasadi* as reported by Ray becomes synonymous with *Z. auerbachii*.

A careful examination of the preparations sent to me by P. L. Misra reveals that they are myxosporidians and this myxosporidian also resembles *Z. auerbachii* (Weill) in all essential features except that the spores are slightly bigger in size.

Description of Zschokkella auerbachii (Weill).

Host:—*Bufo melanostictus* Schneider, *Rana tigrina* Daud and *R. limnocharis* Wiegman.

Habitat:—Gall-bladder.

Locality:—Calcutta and Mukteswar (U.P.).

Vegetative form:—The mature trophozoites (Pl. 4, figs. 6 and 7) are irregular, some being oval in shape, others are disc-shaped while a few have an elongated amoeboid form. The young trophozoites (Pl. 4, fig. 8) are, however, circular in outline having a large number of nuclei and vacuolated cytoplasm. The nuclei (Pl. 4, fig. 10) contain a chromatin granule at their centre and vary from 3.1 to 4.2 μ in diameter. Weill (1929) observed the difference between ectoplasm and endoplasm of the trophozoites, which, however, I failed to distinguish both in young and mature forms as well as in fresh and stained conditions. The outer wall of the trophozoites is composed of a thin, more or less hyaline matrix which is followed by a densely granular layer and a vacuolated inner layer (Pl. 4, fig. 9). The largest diameter of the circular and oval forms varies from 1.07 to 1.7 mm. while the elongated forms are 1 to 1.75 mm. in length and .39 to .5 mm. in width. The thickness of the trophozoites varies from 15–30 μ . The size of the trophozoites given above differs very widely from those given by Weill.

Cell differentiation becomes marked with the growth of the parasites. Some of the cells (Pl. 4, fig. 12) develop into pansporoblasts which become differentiated first at the periphery of the trophozoites. As many as twelve nuclei could easily be counted within a pansporoblast (Pl. 4, fig. 13). Each pansporoblast gives rise to two sporoblasts (Pl. 4, figs. 14–16), each of which forms a single spore. Fully formed trophozoites contain a large number of spores which most probably escape by the rupture of the plasmodial forms. Hence the trophozoites are polysporous, the pansporoblasts disporoblastic and the sporoblasts monosporic.

Endogenous buds (Pl. 4, fig. 7) are developed within the developing plasmodial forms. First they appear as small uninucleate cells. The nucleus by its further division gives rise to a number of nuclei of uniform shape and size. When the endogenous buds attain the size of 40–60 μ in diameter they migrate towards the periphery of the trophozoites and finally separate from the mother plasmodial form. Weill observed plasmogamy, which, however, was not seen by me.

Spore: The spores resemble the description given by Weill (1929). In front view, they are more or less semicircular (Pl. 4,

fig. 17) and ovoidal (Pl. 4, fig. 18) in side view. Both the ends of the spore are round, one of them is, however, narrower than the other. The shape of the spores appears different when viewed from different angles and this might have led Ray (1933) to call it a new species other than *Z. auerbachii*. The shell is thin and the valves are marked with striations. The sutural ridge is prominent and runs obliquely. The polar capsules are spherical being equal in size and they show distinctly coiled filaments in living conditions. The sporoplasm, which can equally be distinguished both in fresh and stained spores, is situated on the dorsal side of the spore and extends ventrally between the two polar capsules. It appears granular if the spores are stained and contains one or two nuclei (Pl. 4, figs. 20 and 21). The mononucleate spores are no doubt derived from the binucleate ones by the fusion of their nuclei. The size of the spores is approximately the same as given by Weill.

Dimensions: length of the spore 10.3μ , breadth of the spore 6.18μ , polar capsules 4.12μ in diameter, filament of the polar capsules $40-50\mu$ in length. Dimensions of the spores obtained from *R. limnocharis*: length $12.36-14.42\mu$, breadth $6.18-8.24\mu$, polar capsules $4.12-5.21\mu$.

The table below shows a comparison between the original description given by Weill and the description given in this paper.

Vegetative Form.			Spore.		
	Shape.	Size.	Shape.	Size.	Polar capsules.
Description given by Weill.	Discoidal; difference between ectoplasm and endoplasm.	$50-180\mu$ in diameter.	Regularly sub-spherical with angles rounded when seen from the side and ellipsoidal when seen from the surface.	$11\mu \times 6\mu$.	Spherical in shape; 3μ in diameter; polar filament $89-90\mu$ long.
Description given by the present author.	Irregular; no difference between ectoplasm and endoplasm.	$1000-1750\mu$ in longest diameter.	Semicircular in side view; angles rounded but one end slightly tapering; ovoidal in side view.	$10.3\mu \times 6.18\mu$ and $12.36-14.42\mu \times 6.18-8.24\mu$.	Spherical in shape; 4.12μ in diameter; polar filament $40-50\mu$ long.

REFERENCES.

- AUERBACH, M.,* 1910. Die Sporenbildung von *Zschokkella* und das System der Myxosporidian. *Zool. Anz.*, 35.
- CHAKRAVARTY, M., 1939. Studies on Myxosporidia from the fishes of Bengal, with a note on the myxosporidian infection in aquaria fishes. *Arch. Protistenkde.*, 92.
- CORDERO, E. H.,* 1919. *Cystodiscus immersus* Lutz. Myxosporidie de los batracios del Uruguay. *Physis* (Rev. de la Soc. Agr. de Ciencias Naturales, 4).
- DAVIS, H. S.,* 1917. The Myxosporidia of Beaufort Region. A systematic and biologic study. *Bull. Bur. Fish.*, 35.
- DUNKERLY, J. S., 1921. Fish Myxosporidia from Plymouth. *Parasit.*, 12.
- FANTHAM, H. B., PORTER, ANNIE and RICHARDSON, L. R., 1939. Some Myxosporidia found in certain fresh-water fishes in Quebec province, Canada. *Parasit.*, 31.
- FUJITA, T., 1927. Studies on Myxosporidia of Japan. *Jour. Coll. Agr., Hokkaido, Imp. Univ.*, 16.
- KLOKACEWA, S., 1914. Ueber die Myxosporidien der Karausche. *Zool. Anz.*, 44.
- KUDO, R., 1920. Studies on Myxosporidia. A synopsis of genera and species of Myxosporidia. *Illinois Biol. Monogr.*, 5, Nos. 3, 4.
- , 1933. A taxonomic consideration of Myxosporidia. *Trans. Amer. Micr. Soc.*, 52.
- LUTZ, A.,* 1889. Ueber eine Myxosporidium aus der Gallenblase brasilianischer Batrachier (*Cystodiscus immersus*). *Centralbl. Bakt. u. Parasit.* 5.
- NEMECZEK, A., 1922. Ueber *Zschokkella rovigensis* spec. nov. *Arch. Protistenkde.*, 45.
- RAY, H. N., 1933a. Myxosporidia from India. *Proc. Ind. Sci. Cong. Zoology*.
- , 1933. Preliminary observations on Myxosporidia from India. *Current Science*, 1.
- WEILL, R., 1929. Notes protistologiques indochinoises (Deuxieme serie), 4. Observations sur la position systematique de *Cystodiscus immersus* Lutz, 1889, et la non-justification du genre *Zschokkella* Auerbach 1910, 5. Sur une myxosporidie nouvelle, *Cytodiscus auerbachii*, n.sp. parasite dun Batracien indochinois, *Bufo melanostictus* Schneider. *Arch. Zool. exper. et. gen.* 69 (notes et revue).

* Original paper not seen.

EXPLANATIONS OF PLATE.

Figures were drawn under a camera lucida and magnified 1666 times, unless otherwise stated.

Zschokkella lissemysi n.sp., figs. 1-5.

FIGS. 1 and 2. Young trophozoites from a stained smear.

Fig. 3. Front view of a fresh spore, showing the position of the polar capsules with their ducts and the lid.

FIG. 4. Side view of a fresh spore, showing the striations on the shell.

FIG. 5. A spore from a stained smear.

Zschokkella auerbachii (Weill), figs. 6-21.

FIGS. 6 and 7. Microphotographs of two stained mature trophozoites.

Note in fig. 7, the endogenous buds, one of which is seen to separate from the mother plasmodial form on the right hand side. $\times 54$.

FIG. 8. Microphotograph of a stained young trophozoite. $\times 710$.

FIG. 9. Part of a stained trophozoite in section to show the three layers.

FIG. 10. A vegetative nucleus from a stained smear.

FIG. 11. A dividing vegetative nucleus from a stained smear.

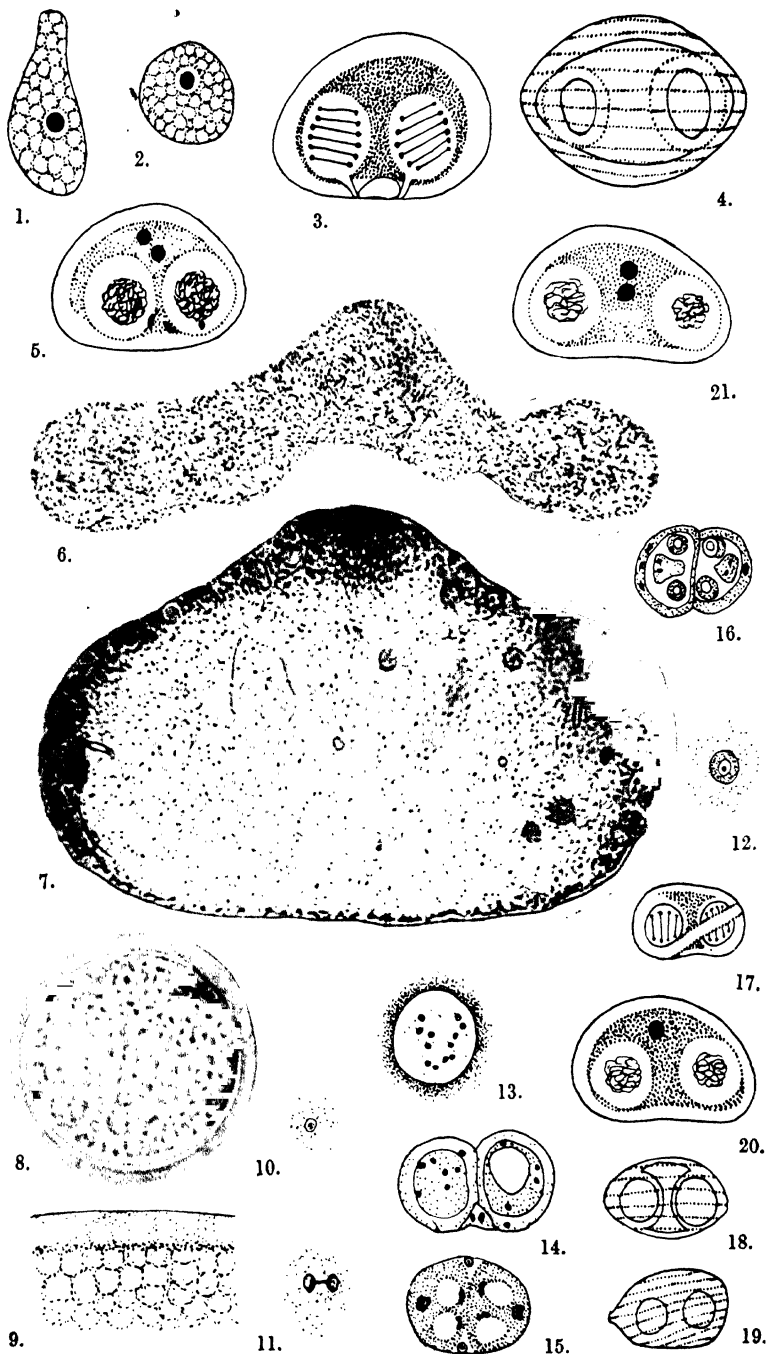
FIGS. 12-16. Development of spore from a stained smear; fig. 12 uninucleate pansporoblast; fig. 13 pansporoblast showing twelve nuclei; fig. 14 pansporoblast differentiated into two sporoblasts; figs. 15 and 16, development of a single spore within each of the sporoblasts.

FIG. 17. Front view of a fresh spore.

FIG. 18. Side view of a fresh spore.

FIG. 19. A fresh spore showing striations on the shell.

FIGS. 20 and 21. Two stained spores from a stained smear. $\times 3500$.



On a Collection of Fish from Kalimpong Duars and Siliguri Terai, Northern Bengal.¹

By SUNDER LAL HORA and J. C. GUPTA.

In 1938, Messrs. G. E. Shaw and E. O. Shebbeare published in the *Journal* of the Society (*Science*, III, pp. 1-137, text-figs. 1-130, pls. i-vi, 1937, December 1938) an illustrated account of the 'Fishes of Northern Bengal' and listed 131 species, a few of which are stated to be exotic as they had been purchased only from the markets at Siliguri and similar other places served by railway. All the same, the indigenous species of this region certainly number over one hundred. It has long been recognized that the fish-fauna of the Eastern Himalayas and the Assam Hills is very rich, for this area forms a meeting place of the Indo-Chinese, Indo-Malayan and Indian elements of the fish-fauna of the Oriental Region. The study of the fishes of northern Bengal is, therefore, of special interest from a zoogeographical point of view. Moreover, a fair number of freshwater species described by Hamilton in his *Gangetic Fishes* were obtained from northern Bengal and to elucidate their precise taxonomic position one has to rely, in the absence of types, on topotypes. In view of these considerations, the Zoological Survey of India had been trying for some years to obtain well preserved specimens of fishes from this region for its collection in the Indian Museum. However, a good opportunity to study this fauna occurred when in November-December, 1938, one of us (S. L. Hora) led a party of the Zoological Survey of India to the Kalimpong Duars and the portion of the Terai in the Siliguri Sub-Division of the Darjeeling District, and collections of fish were made from a large number of small streams, ponds and ditches. The party visited Mongpong, Chunbhati, Ghish and Burrikhola in the Kalimpong Duars, and Siliguri, Sevoke, Kalijhora, Naksalbari and Kharibari in the Siliguri Sub-Division.

The country surveyed was almost level or slightly undulating here and there, but it was cut up by innumerable small streams and *nallahs* which carry large volumes of water during the rains but become reduced to a small stream or a mere trickle during the dry season. Some of the streams flowed through vast arid expanses, while the valleys of others were well shaded with thick forests. The beds of these streams were often pebbly or sandy and only in a few cases the sides were steep and rocky.

¹ Published with permission of the Director, Zoological Survey of India.

Here and there deep pools occurred, but generally the water was clear and shallow. There was very little aquatic vegetation except for algae covering rocks or stones, or floating in side-pools.

From the types of localities visited by the party, the fish-fauna can be divided into two principal ecological associations. The first association comprises pool-dwelling forms, such as *Danio aequipinnatus* (McClelland), *D. dangila* Hamilton, *D. devario* Hamilton, *Brachydanio rerio* (Hamilton), *Esomus danricus* (Hamilton), *Barbus (Puntius) conchoniensis* Hamilton, *B. (Puntius) sophore* Hamilton, *B. (Puntius) ticto* Hamilton, *Mystus vittatus* (Bloch), *Xenentodon cancila* (Hamilton), *Ambassis ranga* (Hamilton), *Badis badis* (Hamilton), *Ophicephalus gachua* Hamilton, *O. punctatus* Bloch, *Colisa chuna* (Hamilton), etc., etc. These can be further divided into two categories—those that live in clear water pools in the course of the streams and those that live in stagnant pieces of water. Some of the species are adapted to both types of habitats. The second association comprises those species that live in shallow swift currents, and here again we have certain fishes, such as loaches and loach-like catfishes which live among pebbles at the bottom, and certain others which live in rapids by sheer muscular efforts. The fishes of the second category comprise Mahseers, of which three distinct types were collected by the party.

In making a collection of fishes, small streams were dammed across and their waters diverted. In the drying up channels below the dams a great variety of fishes were collected by turning over rocks and stones. A small bag-net was also used in catching fish from ponds and ditches, and deeper parts of streams. Attention may also be directed to the fact that almost all the species in the collection are represented by very young specimens which shows that the fish in this part of the country breed during or immediately after the monsoon months.

The following species of fish were obtained by the party:—

Family: CYPRINIDAE.

Subfamily: ABRAMADINAE.

1. *Chela bacaila* Hamilton.

Subfamily: RASBORINAE.

2. *Barilius barna* Hamilton.
3. *Barilius benedesis* Hamilton.
4. *Barilius (Opsarius) bola* Hamilton.
5. *Barilius shacra* Hamilton.
6. *Barilius vagra* Hamilton.
7. *Danio aequipinnatus* (McClelland).
8. *Danio dangila* Hamilton.
9. *Danio devario* Hamilton.

10. *Danio (Brachydanio) rerio* Hamilton.
11. *Esomus danricus* (Hamilton).

Subfamily: *CYPRINAE*.

12. *Aspidoparia jaya* (Hamilton).
13. *Aspidoparia morar* (Hamilton).
14. *Barbus (Chagunius) chagunio* (Hamilton).
15. *Barbus (Puntius) conchoni* Hamilton.
16. *Barbus (Lissochilus) hexagonolepis* McClelland.
17. *Barbus (Tor) putitora* (Hamilton).
18. *Barbus (Puntius) sarana* (Hamilton).
19. *Barbus (Puntius) sophore* Hamilton.
20. *Barbus (Puntius) ticto* Hamilton.
21. *Barbus (Puntius) titius* Hamilton.
22. *Barbus (Tor) tor* (Hamilton).
23. *Crossochilus latius* (Hamilton).
24. *Garra annandalei* Hora.
25. *Garra gotyla* (Gray).
26. *Labeo dero* (Hamilton).
27. *Labeo dyocheilus* (McClelland).
28. *Semiplotus semiplotus* (McClelland).

Subfamily: *SCHIZOTHORACINAE*.

29. *Oreinus molesworthii* Chaudhuri.

Family: *PSILORHYNCHIDAE*.

30. *Psilorhynchus balitora* (Hamilton).
31. *Psilorhynchus sucatio* (Hamilton).

Family: *COBITIDAE*.

32. *Aborichthys elongatus* Hora.
33. *Acanthopthalmus pangia* (Hamilton).
34. *Lepidocephalus guntea* (Hamilton).
35. *Nemachilus beavani* Günther.
36. *Nemachilus botia* (Hamilton).
37. *Nemachilus devdevi* Hora.
38. *Nemachilus rupicola* var. *inglisi* Hora.
39. *Nemachilus savona* (Hamilton).
40. *Nemachilus scaturigina* (McClelland).
41. *Somileptes gongota* (Hamilton).

Family: *OLYRIDAE*.

42. *Olyra longicaudata* McClelland.

Family: *SILURIDAE*.

43. *Silurus cochinchinensis* Cuvier and Valenciennes.

Family: *SCHILBEIDAE*.

44. *Clupisoma garua* (Hamilton).

Family: *BAGRIDAE*.

45. *Batasio batasio* (Hamilton).

46. *Batasio tengana* (Hamilton).

47. *Mystus vittatus* (Bloch).

Family: AMBLYCEPIDAE.

48. *Amblyceps mangois* (Hamilton).

Family: SISORIDAE.

49. *Laguvia shawi* Hora.

Family: XENENTODONTIDAE.

50. *Xenentodon cancila* (Hamilton).

Family: AMBASSIDAE.

51. *Ambassis baculis* (Hamilton).

52. *Ambassis ranga* (Hamilton).

Family: NANDIDAE.

53. *Badis badis* (Hamilton).

Family: GOBIIDAE.

54. *Glossogobius giuris* (Hamilton).

Family: OPHICEPHALIDAE.

55. *Ophicephalus gachua* Hamilton.

56. *Ophicephalus punctatus* Bloch.

Family: OSPHRONEMIDAE.

57. *Colisa chuna* (Hamilton).

Family: MASTACEMBELIDAE.

58. *Mastacembelus armatus* (Lacépède).

To the species listed by Shaw and Shebbeare from northern Bengal, we have added three more species, viz. *Barbus* (Tor) *tor* (Hamilton),¹ *Batasio tengana* (Hamilton),² and *Ambassis baculis* (Hamilton). *Barbus* (*Lissochilus*) *hexagonolepis* McClelland³ of our list is the same as *Barbus dukai* Day of the list of Shaw and Shebbeare, *Barbus* (*Puntius*) *sophore* Hamilton⁴ is the same as *B. stigma* (Cuv. and Val.), and *Olyra longicaudata* McClelland⁵ is the same as *O. kempfi* Chaudhuri. In the course of our revision we have also found it necessary to make alterations in the generic or subgeneric names of certain species listed by Shaw and Shebbeare; these are *Barilius* (*Opsarius*) *bola*

¹ Hora, S. L.—*Journ. Bombay Nat. Hist. Soc.*, XLI, pp. 518–525, 3 pls., 1 text-fig. (1940).

² Hora, S. L. and Law, N. C.—*Rec. Ind. Mus.*, XLIII, pp. 36–39, pl. ii, figs. 1–3, (1941). The taxonomic position of *Batasio* (Blyth) is also discussed in this article.

³ Hora, S. L.—*Journ. Bombay Nat. Hist. Soc.*, XLII, pp. 78–88, 1 pl., 4 text-figs. (1940).

⁴ Chaudhuri, B. L.—*Mem. Ind. Mus.*, V, pp. 436–438 (1916).

⁵ Hora, S. L.—*Rec. Ind. Mus.*, XXXVIII, pp. 202–207 (1936).

Hamilton,¹ *Barbus (Chagunius) chagunio* (Hamilton),² *Clupisoma garua* (Hamilton),³ and *Colisa chuna* (Hamilton). Further, it has been found that *Lepidocephalus annandalei* Chaudhuri is a juvenile colour form of *L. guntea* (Hamilton). Notes on the variation of the dorsal spine of *Semiplotus semiplotus* (McClelland) and on the systematic position of *Barbus (Puntius) titius* Hamilton are given. In well preserved specimens of *Laguvia shawi* Hora there is a distinct adhesive pad in the chest region similar to that of the species of *Glyptothorax* Blyth.

Lepidocephalus guntea (Hamilton).

1878. *Lepidocephalichthys guntea*, Day, *Fish. India*, p. 609, pl. clv, fig. 4.
 1912. *Lepidocephalichthys annandalei*, Chaudhuri, *Rec. Ind. Mus.*, VII, p. 442, pl. xl, figs. 3, 3a, 3b.
 1938. *Lepidocephalichthys annandalei*, Shaw and Shebbeare, *Journ. Roy. As. Soc. Bengal, Science*, III, p. 67, text-fig. 64.
 1938. *Lepidocephalichthys guntea*, Shaw and Shebbeare, *ibid.*, p. 68, text-fig. 65, pl. ii, fig. 2.

Lepidocephalus guntea is represented in the collection by a very large number of specimens. As has been noted by previous workers, the colouration varies considerably with the size and habitat of the individuals. In a number of young specimens, there are two ocelli in connection with the caudal fin which are situated exactly in the same positions as described by Chaudhuri for his *L. annandalei*. In other respects also the colouration of the juvenile examples agrees with that of Chaudhuri's species. For these reasons we regard the two species as conspecific.

Semiplotus semiplotus (McClelland).

1937. *Semiplotus semiplotus*, Shaw and Shebbeare, *Journ. Roy. As. Soc. Bengal, Science*, III, p. 59, text-fig. 56, pl. v, fig. 8.
 1937. *Semiplotus semiplotus*, Hora, *Rec. Ind. Mus.*, XXXIX, pp. 45, 46.

Semiplotus semiplotus is represented in the collection by 15 young examples ranging in standard length from 17 to 107 mm. All the specimens possess small maxillary barbels which are more pronounced in smaller individuals (*vide* Hora, *loc. cit.*, pp. 45, 46). In the three specimens collected from the Joyranti Stream, 33 to 38 mm. in standard length, the distal half of the dorsal spine is slightly serrated, but in all other respects they agree with the remaining young examples, in which the dorsal spine is smooth throughout. The dorsal spine

¹ Hora, S. L.—*Journ. Bombay Nat. Hist. Soc.*, XXXIX, pp. 199–210, 1 pl., 3 text-figs. (1937).

² Smith, H. M.—*Proc. Biol. Soc. Washington*, LI, pp. 157, 158 (1938).

³ Hora, S. L.—*Journ. Bombay Nat. Hist. Soc.*, XXXIX, pp. 659–678, 1 pl., 9 text-figs. (1937).

is also slightly serrated in a specimen, about 67 mm. in length, from the Mahanadi River.

In connection with the structure of the dorsal spine noted above, attention may be directed to the fact that the only other species of the genus, *S. modestus* Day¹ from Burma, is characterized by a serrated dorsal spine. It seems probable that the serrated dorsal spine in the juvenile examples of *S. semiplotus* referred to above is an embryonic or atavistic character, and indicates that *S. modestus* is probably a less specialized member of the genus than *S. semiplotus*.

Barbus (Puntius) titius Hamilton.

1822. *Cyprinus titius*, Hamilton, *Fish. Ganges*, p. 315.
 1839. *Systomus tetrarupagus*, McClelland, *Ind. Cyp.*, pp. 285, 381, pl. xliv, fig. 3.
 1868. *Barbus titius*, Günther, *Cat. Fish. Brit. Mus.*, VII, p. 154.
 1878. *Barbus tetrarupagus*, Day, *Fish. India*, p. 572, pl. cxlii, fig. 5.
 1889. *Barbus tetrarupagus*, Day, *Faun. Brit. Ind., Fish.*, I, pp. 318, 319.
 1937. *Barbus titius*, Shaw and Shebheare, *Journ. Roy. As. Soc. Bengal, Science*, III, p. 44, text-fig. 39, pl. v, fig. 5.
 1939. *Barbus tetrarupagus*, Das, *Rec. Ind. Mus.*, XLI, p. 441.
 1940. *Barbus (Puntius) tetrarupagus*, Hora, *Rec. Ind. Mus.*, XLII, p. 370.

Cyprinus (Puntius) titius was 'found in ponds near Calcutta', but insufficiently characterized by Hamilton, who on account of its utmost resemblance with *C. ticto* 'did not think it necessary to take a drawing or particular description of the Calcutta kind'. However, he distinguished the species mainly on the position of colour spots; in *C. ticto* there is 'one black spot on the lateral line above each pectoral fin, and another near the end of the tail; and with the back fin spotted', while *C. titius* is provided 'with two black spots on each side, near the lateral line; with no spots on the dorsal fin'. Another important difference that can be readily made out from Hamilton's descriptions of the two species is in the nature of their dorsal spine; in *C. ticto* it is indented behind while in *C. titius* it is smooth. McClelland doubtfully referred *C. titius* to his *Systomus tetrarupagus* which he characterized by the possession of 'a black spot on either side behind the opercula and another at the end of the tail' and remarked (foot-note, p. 285) '*Cyprinus ticto* (Buch). P.G. t.8.f.87, is nearly allied to this species, but shorter'. Though Günther regarded Hamilton's species as valid, with *Systomus tetrarupagus* as its synonym, Day considered both the species doubtful. However, Day adopted the specific name *tetrarupagus* for describing this species. Recently Das and Hora followed Day, but Shaw and Shebheare had rightly described the species under its original name.

¹ Day, F.—*Fish. India*, p. 550, pl. cxxxiii, fig. 1 (1877).

B. (Puntius) titius is a characteristic species and is represented in the collection by two adult specimens 56 mm. and 68 mm. in standard length respectively; it can be readily distinguished by its colour spots. According to Day, *B. tetrarupagus* it is found in 'Orissa, Bengal, Assam, N.W. Province, Punjab, and Sind, also the Deccan'.

SUMMARY.

Attention is directed to the great importance of the study of the fish-fauna of the Eastern Himalayas and notes are given on the physical conditions of the parts of the Kalimpong Duars and of the Siliguri Terai in which collections were made. The fish-fauna is roughly divided into ecological associations and a reference is also made to the methods of collecting fish.

A list of 58 species is given and additions and alterations made in a list of 131 species of fish of northern Bengal published by Messrs. Shaw and Shebbeare in 1938 are explained. Taxonomic notes are given on *Lepidocephalus guntea* (Hamilton), *Semiplotus semiplotus* (McClelland), and *Barbus (Puntius) titius* Hamilton.

**A Note on the History of Bacteriology and some of the
Early Workers in India.**

By MAJOR C. L. PASRICHA, I.M.S.

This short communication is prepared from some notes and analyses made during the course of reading Bulloch's (1938) history of bacteriology. At the end of this excellent and valuable book there are biographical notices of some of the early workers in bacteriology. In this are listed 330 bacteriologists and others whose work contributed to the development of bacteriology. The nationality of these pioneer workers was analyzed and is given in Table I.

TABLE I.

The Nationality of the 330 Early Workers in Bacteriology.

Nationality.	Number.	Percentage of total.
German	113	34.24
English	58	17.58
French	55	16.66
American	24	7.27
Austrian	16	4.85
Italian	15	4.55
Danish	8	2.42
Russian	8	2.42
Hungarian	5	1.51
Japanese	5	1.51
Swiss	4	1.21
Dutch	3	0.91
Belgian	3	0.91
Canadian	2	0.6
Rumanian	2	0.6
Polish	2	0.6
Portuguese	1	0.3
Spanish	1	0.3
Norwegian	1	0.3
Ukrainian	1	0.3
Yugo-Slavian	1	0.3
Lithuanian	1	0.3
Maltese	1	0.3

The rapid development of bacteriology in the second half of the nineteenth century is well seen in Table II in which is given the number of workers in successive decades during the 19th century (except the last decade). It is interesting to note that a marked increase in the number of workers occurs two decades after the birth of Pasteur.

There are listed 29 workers born earlier than 1800 (one each in the 15th and 16th centuries, nine in the 17th century and eighteen in the 18th century). There are five workers whose date of birth is unknown leaving a total of 296 workers born in the 19th century. These have been analyzed according to their nationality and the decade in which they were born.

Of the 330 early workers in bacteriology listed by Bulloch seventeen came to India. These workers are listed below alphabetically together with some notes of the work done by them and references where further information can be found.

EARLY WORKERS IN BACTERIOLOGY WHO CAME TO INDIA.

1. CARTER. HENRY VANDYKE (British, born 1831, died 1897).

Joined the Indian Medical Service in 1858 and was Professor of Anatomy and Physiology in Grant Medical College, Bombay (from 1858 to 1863). Worked at leprosy, mycetoma, surra, malaria and relapsing fever. Whilst a demonstrator of anatomy in St. George's Hospital drew the illustrations for Gray's Anatomy. In an obituary notice in the British Medical Journal (1897) is found a true epitaph of this worker. 'Carter devoted his life, his talents, his pen and his pencil unsparingly and unflaggingly to the service of science and of India'. In recognition of his work on relapsing fever Carter received the Stewart Pathological Prize of £500 awarded by the British Medical Association.

Brit. Med. Journ., 1897 (i), 1256.

Lancet, 1897 (i), 1381.

2. CUNNINGHAM, DAVID DOUGLAS (British, born 1843, died 1914).

Entered the Indian Medical Service in 1868 and in company with Lewis went to Germany to learn the views and master the technique of Hallier and De Bary, and to work for a time under Pettenkofer at Munich. Cunningham and Lewis reached Calcutta in 1869 and for the next ten years both were engaged in important pathological and hygienic studies. With Timothy Lewis made exhaustive study of cholera in India. Cunningham became Professor of Physiology and for a time also of Pathology in Calcutta Medical College. During his residence in India Cunningham was at frequent intervals a councillor of the Asiatic Society of Bengal. He was for many years one of the trustees of the Indian Museum and an active member (later the Chairman) of the committee of management of the Calcutta Zoological Garden. It was on his suggestion and in accordance with his plans that a research laboratory was established in the Zoological gardens. He was elected F.R.S. in 1889, awarded C.I.E. in 1893 and retired in 1899.

Brit. Med. Journ., 1915 (i), 98 and 141.

Proc. Roy. Soc. London, 1916, B LXXXIX, 15-20.

3. DOUGLAS, STEWART RANKEN (British, born 1871, died 1936).

Joined Indian Medical Service 1898. Served in China expedition 1900-1. Retired from the I.M.S. with rank of Captain. Came into close association with Sir Almroth Wright and worked with him for several years. Studied the serological grouping of vibrios. Later became Director of Bacteriological Department of the National Institute of Medical Research. F.R.S. in 1922.

Lancet, 1936 (i), 229.

4. FISCHER, BERNHARD (German, born 1852, died 1915).

Assistant to Koch in Berlin and came with him on the Cholera Commission to India (1883).

Deut. med. Woch., 1915, xli, 1165.

5. GAFFKY, GEORGE (German, born 1850, died 1918).

Pupil, assistant, and successor of Robert Koch in Berlin. Accompanied Koch on German Cholera Commission to India (1883). Studied cholera in Hamburg 1892. Head of the German Plague Commission in India, 1897.

Berl. Klin. Woch., 1918, lv, 1062.

Deut. med. Woch., 1918, xlv, 1199.

Munch. med. Woch., 1918, lxxv, 1191.

6. HAFKINE, WALDEMAR MORDECAI WOLFF (Ukrainian, born 1860, died 1930).

Trained in Pasteur Institute, Paris. (1888-93) during a time when special study was being made of the preparation of vaccines and their application to prophylactics. An immense impetus had been given to this line of research by Pasteur's great experimental demonstration of the value of his vaccine against anthrax. Hafkine arrived in Calcutta in March 1893 and from here he travelled across to different places in India. In the first year he inoculated about 25,000 persons with his cholera vaccine. In 1894 he returned to Calcutta and carried out a large number of inoculations. In 1896 Hafkine went to Bombay and there produced a plague prophylactic vaccine and used it on a gigantic scale. Hafkine's name will always be associated with both cholera and plague prophylaxis. Founded Government Research Laboratory (now Hafkine Institute), Bombay. Retired in 1915.

Brit. Med. Journ., 1930 (ii), 801.

7. HANKIN, ERNEST HANBURY (British, born 1865).

Wrote early papers on nature of immunity and alexins. Was Chemical Examiner and Bacteriologist to the United Provinces and to the Central Provinces and worked on cholera, particularly the isolation of vibrios from natural waters and noted 'degenerative' forms of vibrios. He also worked on the epidemiology of plague.

8. D'HERELLE, FELIX HUBERT (Canadian, born in Montreal, 1873).

Chiefly known for his work on bacteriophage. Came to India in 1928 when during his short stay he worked extensively on cholera and dysentery bacteriophages.

9. KOCH, ROBERT (German, born 1843, died 1910).

The greatest pure bacteriologist and as Nuttall puts it 'In the annals of medicine his name should be enrolled with the immortals'. Koch first came to India in 1883 and he was one of the first to suggest that human malaria is transmitted

by mosquitoes. It was Koch who first advocated the systematic use of quinine in combating malaria, for he conceived that this disease could be eradicated by discovering the infected persons in a community and subjecting them to radical treatment thereby ridding them of parasites and rendering them no longer capable of infecting the anopheline vectors. Koch continued his study of cholera and in Calcutta he confirmed and extended the observations begun in Egypt and was able to announce the discovery of the cholera vibrio. Koch's work on cholera has scarcely been surpassed to this day. It must be remembered that he worked as a pioneer with the simplest of means. Considering the very great importance of this discovery which paved the way to a clear understanding of the etiology and prevention of this one of the most important scourges of India, it is to be regretted that there exists no memorial to commemorate the great service Koch rendered to this country. In 1896 at the age of 53 Koch came again to India, this time to Bombay as the head of the German Plague Commission.

Journ. Path. and Bact., 1910-11, XV, 108.

Parasitology, 1924-25, XVI, 214-38.

Proc. Roy. Soc., 1910-11, LXXXIII, Supp. 18-24.

10. LAMB, GEORGE (British, born 1870, died 1911).

Member of the Indian Medical Service. Came to India in 1894. Later assistant to Haffkine in Bombay and made important studies of snake venoms. Subsequently became Director of Pasteur Institute in India and initiated important modifications in the treatment of hydrophobia. Lamb carried out extensive investigations on Malta fever in India, on transmission of plague by fleas, and on rabies. For his work on plague he received the Stewart Prize awarded by the British Medical Association.

Journ. Hyg. (Plague Suppl.), 1912, XII, 2.

Journ. Path. and Bact., 1911, XVI, 119.

Brit. Med. Journ., 1911 (i), 969, 1029.

11. LEISHMANN, WILLIAM BOOG (British, born 1865, died 1926).

Joined the Royal Army Medical Corp., 1887. Rose to be Director-General of Army Medical Services. It was during his service in India that he began to take a close interest in bacteriology, especially in relation to dysentery with which he found himself in perpetual contact. Whilst stationed at Netley came under the influence of Almroth Wright. He assisted Wright in the early work on typhoid vaccine and made some investigations into Malta fever, a disease which later he contracted himself in the laboratory. It was here that whilst working with Wright on vaccine therapy that Leishmann introduced his stain which has now superseded its predecessor, the Romanowsky stain. Distinguished for his work on the value of anti-typhoid inoculation, phagocytosis and Leishmaniasis. F.R.S. in 1910.

Lancet, 1926 (i), 1171-3.

12. LEWIS, TIMOTHY RICHARDS (British, born 1841, died 1886).

Joined Army Medical Service and came to India (1869). He studied cholera in collaboration with Cunningham. In 1870 gave the first authentic account of amoebae from the human intestine found in cholera evacuations. In 1872 he gave the first account of '*Filaria sanguinis hominis*'. He

gave the first description of rat trypanosoma now called *T. lewisi*.

Parasitology, 1923, xiv, 413.

Ind. Med. Gaz., 1886, XXI, 179, 249.

Brit. Med. Journ., 1886 (i), 1242.

Nature, 1886, xxxiv, 76.

13. LUSTIG, ALESSANDRO (Italian, born 1857, died 1937).

Studied plague in India and introduced a method of preventive inoculation against this disease.

Garz. d. osp., 1937, LVIII, 960.

14. MARTIN, CHARLES JAMES (British, born 1866).

Studied plague particularly the mechanism of the transmission of plague by fleas. Was a member of the Plague Advisory Committee. He also worked on the insect porters of bacterial infections.

15. PFEIFFER, RICHARD (German, born 1858).

1896 served on the German Plague Commission in India. Discovered specific lysis of cholera (Pfeiffer's reaction).

Munch. Med. Woch., 1928, LXXV, 524.

16. ROWLAND, SYDNEY DOMVILLE (British, born 1872 died 1917).

Came to India 1905 as a member of the Advisory Committee for Plague Investigation in India and worked in the laboratory at Parel. His more special share in the activities of the working Commission in India was the laboratory work on the relation between fleas and plague. Later in England worked in the preparation of curative sera for plague.

Journ. Path. and Bact., 1916-17, XXI, 453.

Lancet, 1917, (i), 552.

17. WRIGHT, ALMROTH EDWARD (British, born 1861).

1898-1900 Member of Indian Plague Commission when with Dr. Ruffer wrote an important note of dissent (on the measures for the discovery of plague deaths) to the conclusions arrived at by the Indian Plague Commission. Pioneer in typhoid inoculations and developed the subject of therapeutic immunization generally. Responsible also for the training of a band of workers who were imbued with enthusiasm for research by coming in contact with Almroth Wright. Many of the workers in India owed much to the inspiration gained from this teacher.

It was hoped to write of these workers at greater length, to make fuller summaries of the work done by them and to build up a connected story, but other engrossing, more important and urgent duties render this impossible for the present. Suffice it to say that each one of them has left an indelible mark upon the annals of research and discovery in relation to infectious diseases of man and animals. The work done by these pioneer workers has borne, is bearing and will bear much fruit. To take but one instance it was Koch's discovery of the cholera vibrio and the pioneer work of Wright and Leishmann with typhoid vaccine that led to the subsequent large-scale trials under controlled conditions of cholera vaccine by Haffkine. These experiments contributed in no small measure to the establishment of the

value of vaccines as prophylactic agents in the controlling of large epidemic diseases. If it were possible to reckon up the sum of human lives that have been saved from premature death by this procedure alone the total would attain gigantic proportions. India has played an important rôle in two ways, firstly the presence of epidemic diseases and secondly the facilities for large scale trials under controlled conditions and with reasonable facilities for collecting data. The fact that of the 330 early workers who have found place in Bulloch's history of bacteriology seventeen workers came to India is sufficient justification for India to feel proud of the facilities that she has been able to offer these workers and thus to the development of the science of bacteriology. For her part India and her present-day workers should ever keep these men in grateful memory.

REFERENCES.

- BULLOCH, W., (1938). *The History of Bacteriology*, p. 349 et seq., Oxford University.



Life-History and Wanderings of *Hilsa* in Bengal Waters.¹

By SUNDER LAL HORA.

"To study the wants of a people, to inquire into the history, language, habits, and customs of a nation, is generally deemed a duty on the part of its rulers; but hardly any objects of research are more worthy of the attention of a Government than the sources whence the food of the population is derived, or the nature of the articles most adapted for its manufacturing processes, or best fitted in the raw state for its home or foreign trade. In India the details of Native agriculture have been carefully studied, if they have not been improved; the earth has been ransacked for its minerals; the forests have been explored for their timber; the land for its agricultural capabilities, even the atmosphere for its meteorological variations; and in all these matters Government has wisely shown its interest; but the fish with which the fresh waters of Hindustan teem, and which abound in the seas that wash her coasts, have rarely met with attention from those in authority, or even from individuals whose private tastes have led them towards the cultivation of zoological science."

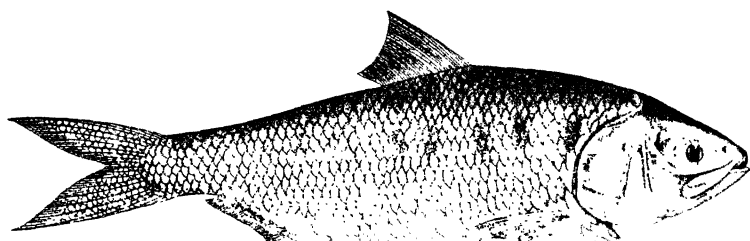
Francis Day, "The Fishes of Malabar", p. vii (London: 1865).

In Bengal, it can be stated, without the least fear of contradiction, that *Hilsa* is undoubtedly the **Hilsa fishery of Bengal** most important edible fish, whether from the point of view of the numbers caught or in view of the esteem in which it is held by the fish-eating population of the province. Although the *Hilsa* season proper lasts only for a few months during the rains the oily nature and delicious flavour of the fish, in spite of the numerous little bones which it contains, make it a most acceptable article of diet for the rich and the poor alike. Though Carp, such as Rohu, Catla, Mrigal, Calbausa, Bata, etc., are perhaps collectively of greater economic importance, no single species can claim to have the same fishery value for this province as *Hilsa*. It is essentially a marine fish of the Herring family; and, in view of its periodic ascent into the fresh waters, is known as the Indian Shad. The species, as at present understood, is known from the Persian Gulf, where it ascends into the Tigris River; from the Coast of Sind, where it is known as *Pulla* and forms an important fishery in the Indus River, and the Bay of Bengal, whence it ascends into all the principal rivers of India and Burma. I shall, however, restrict myself this evening to its wanderings in Bengal waters.

¹ Lecture delivered at the Royal Asiatic Society of Bengal on Tuesday, the 25th March 1941.

The migratory habit of the species is of the greatest value from the point of view of its fishery, for it enables us to consume this marine fish in a fresh condition very far inland; it has been caught in the Ganges System as high up as Agra and Delhi.

The life-history of this most valuable fish of the Bengal waters has until quite recently been little known, but the researches carried out by the Zoological Survey of India since 1936 have materially helped to elucidate the nature and causes of its wanderings. With a fish of such handsome appearance and delicious taste one does not need to be a zoologist to be interested in its bionomics and life-history, and it is for this reason that I have selected "Life-History and Wanderings of *Hilsa* in Bengal Waters" as the subject of my talk this evening.



Text-fig. 1.—Lateral view of *Hilsa ilisha* (Hamilton). After Day.
The lateral markings on the body indicate that the figure was made from a half-grown specimen. In the young, these markings are very prominent, while in the adult they are generally absent.

At the very outset I wish to emphasize that a thorough knowledge of the bionomics, breeding, development, rate of growth, period of maturity, etc. of any fish of economic importance is a necessary requisite for the proper exploitation, development and conservation of its fishery in all its aspects. How backward we are in this respect will be clear from Kemp's statement made in 1938 before the British Association to the effect that "throughout almost the whole of the vast stretch of the Indo-Pacific region there is scarcely a fish whose life-history is fully known and whose various stages from egg to adult can be recognized."

Those interested in the fisheries of Bengal are no doubt aware of the fact that in 1906, the Government of Bengal placed the late Sir K. G. Gupta on special duty to enquire into Bengal fisheries. He went into the whole question very fully and after a complete and thorough survey of the fishery resources of the province made a number of valuable recommendations in 1908. With regard to *Hilsa* he stated:

Earlier *Hilsa* Investigations in Bengal. He went into the whole question very fully and after a complete and thorough survey of the fishery resources of the province made a number of valuable recommendations in 1908. With regard to *Hilsa* he stated:

“Very strenuous efforts must also be made to observe the reproductive functions of the *hilsa* and ascertain their spawning grounds, so that when their anadromous character has been established, hatching stations may be opened to introduce artificial propagation for replenishing our rivers.”

In his general account of the species he stated:

“the fishermen of Bengal believe that the *hilsa* does not spawn in the rivers, in proof of which it is asserted that no fry or young ones have ever been caught or seen.”

In view of these weighty recommendations, the Government sent a special officer to America for studying Shad-culture. During 1909 and 1910, after his return from America, the Shad-culture specialist collected some general information relating to *Hilsa* from which he was led to conclude that spawning grounds of the species existed in the vicinity of Monghyr, Bihar. Jenkins found a single young specimen of *Hilsa*, 6 cm. long, from the market at Monghyr towards the end of September 1909 which seemed to confirm the above conclusion. Accordingly experiments were started on the artificial fertilization and hatching of eggs during several subsequent seasons but all efforts failed. Though the eggs have been fertilized and hatched, it has not been possible to rear the larvae to a fingerling stage when they could be safely planted in rivers. In 1914, in the course of his remarks on fishery questions in Bengal, Southwell surmised that:

“The eggs of this species sink rather low in the water. Their development roughly occupies nine days. The spawning grounds are seldom, if ever, more than 600 miles from the sea. They are frequently carried along by the river current at a rate of 90 miles per day. Hence the eggs often reach the sea, or the lower part of the estuaries before they are hatched, and the development of the fry takes place there. The eggs of *hilsa* are thus not only removed from destruction by human agencies, but on account of the fact that they sink in the water, they are never carried into the paddy fields during the flood. It is undoubted I think that the maintained plentifulness of the *hilsa* year by year is due entirely to the above facts. In this case legislation appears wholly unnecessary. The eggs and fry require no protection, and any interference with the fishing of adult *hilsa* is, I think, at present undesirable.”

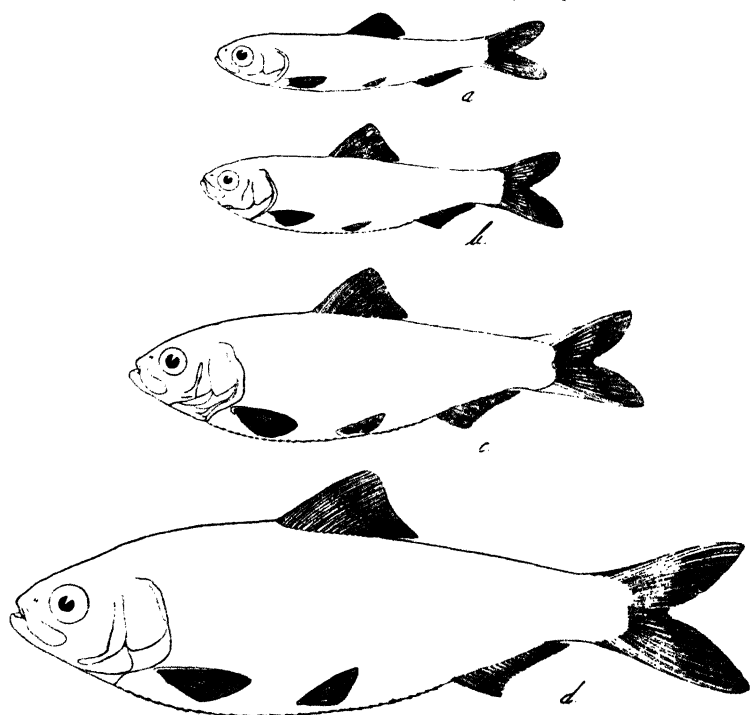
I shall show presently that the life-history of *Hilsa* is different from what was envisaged by Southwell. His timetable of the liberation and the seaward migration of the eggs of *Hilsa* is presumably based on the popular belief that the young are not found in the upper reaches of the rivers. In their general review of *Hilsa* investigations, Southwell and Prashad in 1916 recorded failure in the artificial propagation of the species and stated:

“So far as *Hilsa* are concerned, successful operation in artificial propagation depend almost entirely on our understanding clearly and fully the general habits of the fish in question. The elucidation of these problems is a matter of time, for the secrets of nature are seldom unfolded to the superficial observers.”

In 1919, Prashad reported on the occurrence of *Hilsa* in the rivers of Bengal and in the Gangetic Delta throughout the year and thus cast doubts on the true anadromous nature of the fish. Next year Finlow referred to the enquiries conducted regarding the young *Hilsa* or *Jatka* and the winter *Hilsa*.

The position of *Hilsa* investigations in Bengal was thus summed up by Finlow in 1933 in his note on the scheme for the reorganisation of a Fishery Department in Bengal:

"So far attempts to locate the spawning grounds of *hilsa* have failed, and attempts at artificial fertilization have also been unsuccessful. On the other hand, the fingerling of the *hilsa* has been identified in the *Jatka*, a small fish less than 6" long, found in the Buriganga, Lakhya and Meghna rivers in Eastern Bengal in February-March. It is probable therefore that the main spawning grounds of the *hilsa* are in Eastern Bengal, and investigation to this end, particularly in the Lakhya, Buriganga, Torag and Meghna rivers, should form a definite item of the work of the Fishery Department.



Text-fig. 2.—Young of *Hilsa ilisha* (Hamilton) collected from the filter-beds of the Calcutta Corporation Waterworks, Pulta.

a. 19 mm.; b. 30 mm.; c. 42 mm.; d. 61 mm.

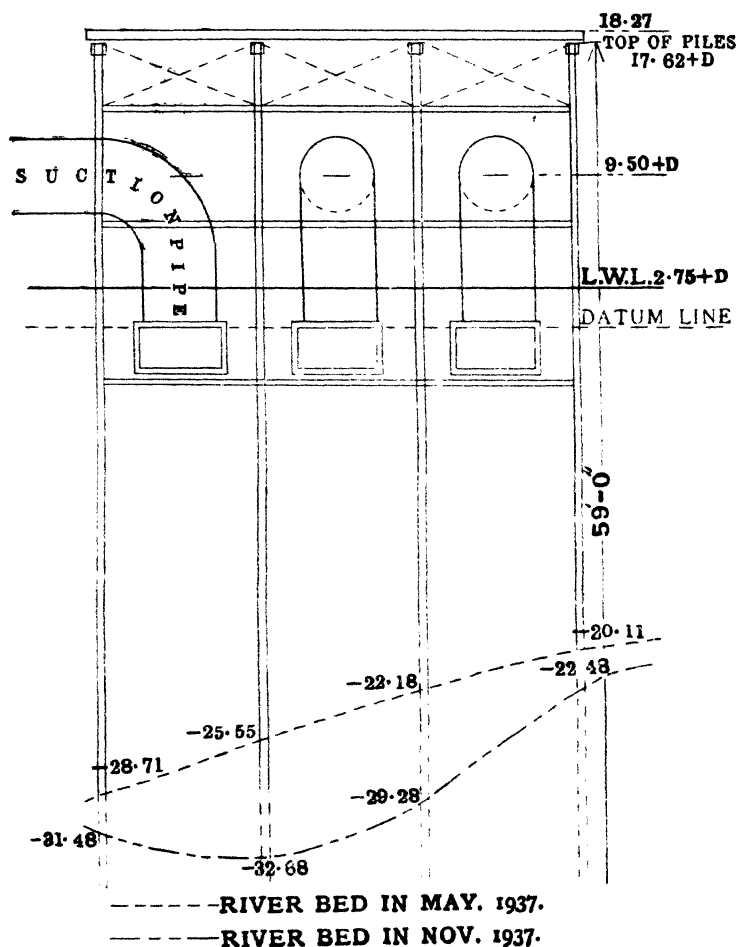
It must be remembered that with the abolition of the Fisheries Department of Bengal in 1923, the **Discovery of the Spawning grounds of *Hilsa*.** *Hilsa* investigation had also come to an end, so there was no current interest in the

problem when, in 1936, by a mere chance I was fortunate to locate the spawning grounds of the species in the river Hooghly in the neighbourhood of the Pulta Waterworks. In 1936, the Corporation of Calcutta requisitioned the services of the Zoological Survey of India to investigate the biology of the filter-beds. In the course of these investigations collections were made of the fauna and a great variety of fish was obtained. Among these were large numbers of young Herring-like forms to which no attention was paid in our preliminary determination of fishes. Fortunately, about this time the Geological Survey of India entrusted to me for study and report a small collection of fossil fish-remains from the Saline Series of the Salt Range, Punjab, among which were several incomplete specimens of small Clupeid fishes. In order to compare them with the present-day forms, the young specimens from Pulta were examined and to my very great surprise some of them appeared to be the young of *Hilsa*. Not being satisfied with my own results, I gave similar specimens to my assistants and students at the Museum and they also found them to be the young of *Hilsa*. Once the discovery was made, we applied ourselves with the meagre resources available to us in the Zoological Survey of India for fishery investigations to unravel the mystery of the life-history and wanderings of this important food-fish of the province, and it gives me pleasure to say that we have already achieved considerable success in elucidating this problem.

Here I must pause and explain the full significance of the occurrence of the young *Hilsa* in the filter-beds of the Waterworks, and have, therefore, to claim your indulgence for a short digression. At the Pulta Waterworks (Plate 5) about 90 million gallons of river water is pumped daily into the settling tanks through 5 pipes—one 36" pipe, one 48" pipe and three 54" pipes. All the pipes are, however, not in commission at the same time. The mouths of the pipes (Text-fig. 3) are directed downwards. The three larger pipes are protected by an iron grating with bars one inch apart, while the other two pipes are provided with valve-like structures which prevent any large object from entering the pipes. It is thus seen that though large objects cannot be sucked into these pipes, fishes a few inches in length and less than one inch in thickness can enter the pipes. In the actual centrifugal pumps (Text-fig. 4), however, there is only a quarter inch space between the impellers and their covers so that larger objects are invariably crushed and only eggs or very young larvae can pass through intact to the settling tanks. This was tested by making several collections of the fauna from the river water soon after it had passed through the pumps; in all samples only very minute objects were obtained. This means that *Hilsa* enters the Waterworks from the river either in the egg stage or as very young larvae. Fortunately one of the *Pucca* Settling

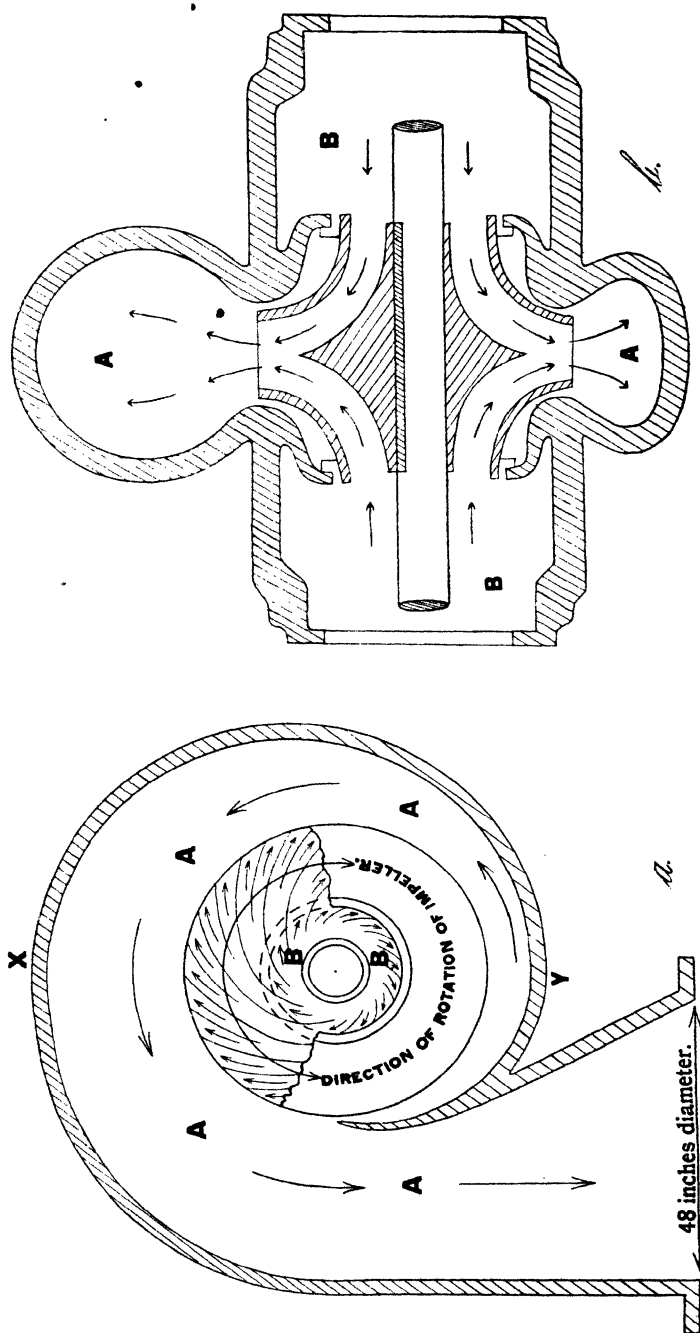
Tanks at Pulta is an isolated one so that it can be easily charged or emptied without any interference with the working of the other units. This tank, 500 ft. long, 250 ft. broad, and on an

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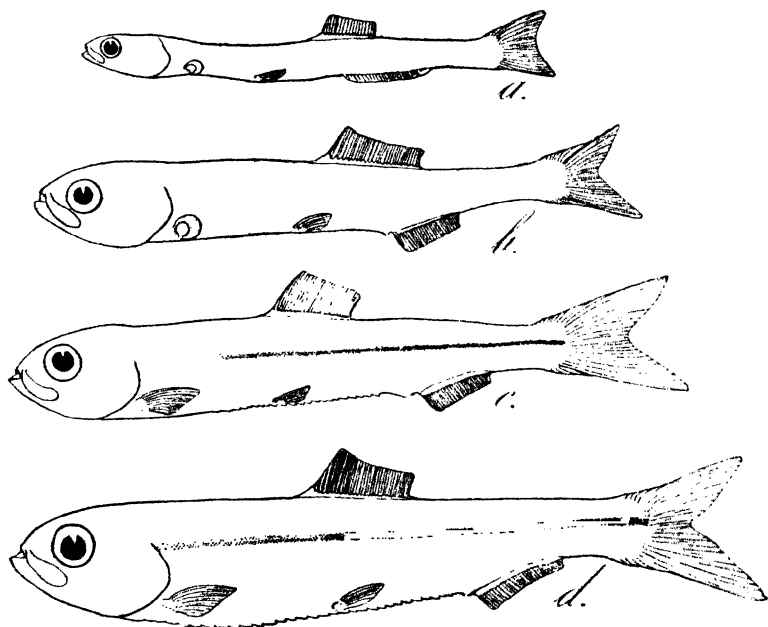
Text-fig. 3.—Section of new jetty for 54" pipes, Calcutta Corporation Waterworks, Pulta. (Copied from *Rec. Ind. Mus.*, XL, p. 151, 1938.)

average about 8 feet deep, is occasionally charged with river water, but when the water in it becomes sufficiently settled, the upper half or more of the water depending upon its suitability is



Text-fig. 4.—Diagrammatic sections of a Centrifugal Pump, Intake-Station, Calcutta Corporation Waterworks, Pulta.
a. Side view of section of the pump; *b.* View of a section through *xy* of *a*; A. Suction space; B. Pressure space.
 An arrow indicates the direction of flow.

drawn off to the filter beds, and the tank is filled up again with river water. This process is repeated from 2 to 8 times in a month depending upon the weather conditions and the amount of suspended matter in the river water at different seasons. The *Pucca* Settling Tanks are thoroughly cleaned once a year and during one such operation on the 21st November, 1937, 900 young *Hilsa* from Tank No. 4 were measured (*vide* Table I, p. 110). From the different sizes represented in this lot, the probable rate of growth of the species was surmised. Further, taking advantage of the fact that only eggs or larval fish can pass through the centrifugal pumps to the settling tanks, the tank was almost completely dewatered once a month so that the young of the various species of fish developed from eggs or larval forms received from the river during the month were collected. It



Text-fig. 5.—Larval forms of *Hilsa ilisha* (Hamilton) collected from the Pucca Settling Tank No. 4, Calcutta Corporation Waterworks, Pulta. $\times 4\frac{1}{2}$. After Nair. (Copied from *Rec. Ind. Mus.*, XLI, p. 411, 1939.).
a. 14 mm.; b. 18 mm.; c. 20 mm.; d. 22 mm.

Mr. K. K. Nair's figures of the larval forms of *Hilsa* show varying number of rays in the dorsal and anal fins, but he has informed me that the figures in this respect are diagrammatic and, therefore, no significance need be attached to this point in considering their identity.

was, however, too costly to dewater the tank completely and to clean it up properly every month, so some young forms received

in the tank during earlier months usually got mixed up with the stock that came in later, but they could be readily eliminated on account of their larger size. The material thus collected for one year (first collection was made on December 28, 1937), has furnished valuable data regarding the season of breeding and the probable rate of growth of a number of species found in the river Hooghly. So far as *Hilsa* is concerned, these observations have conclusively shown that *Hilsa* breeds in the Hooghly throughout the year though the peak period of breeding is during the rainy months of July and August. Observations on the month to month growth of the species have shown that specimens 10 months or a year old are just about a foot in length, and that the fish attains a marketable size in a few months' time. The rate of growth is more rapid during the hot months, and it has been found that during July-August the young of *Hilsa* attain a size of about 2 inches in the first month and thereafter the size increases at the rate of about an inch per month with the exception of the winter months when the growth is somewhat retarded. It may here be stated that similar results had also been obtained by the Madras Fisheries Department regarding the growth of the species in certain South Indian rivers.

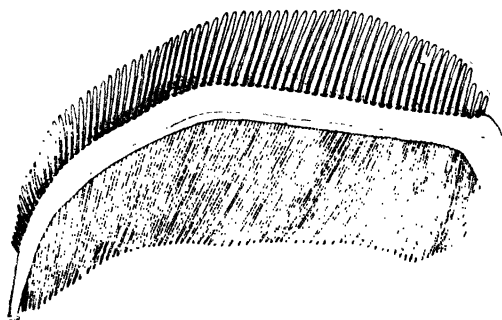
In the *Pucca* Settling Tanks, facilities for the movements of bottom or mid-water fishes, like the *Hilsa*, are restricted and the thorough cleaning of the tanks every year does not permit of such species to grow beyond one year. In another series of five large *Kachha* Settling Tanks, however, the fish can move about freely and some of them can live up to their maximum age. Specimens of 18 inches and over have been obtained from these tanks and some of them were fully mature as the milt and eggs streamed out when they were caught. Whether *Hilsa* is capable of breeding in confined waters or not, we have not been able to ascertain. It is certain, however, that the fish is not unsuitable for tank culture, although it must be stated that in freshwater tanks the fish loses much of its flavour and taste¹. However, experiments may be started in the brackish water areas of the Sunderbans for the culture of this species, for, as I shall presently show, the young of *Hilsa* are plentiful in those waters and no expensive hatcheries are needed for this purpose.

Another important advance in our knowledge of the life-history of *Hilsa* was made near Pulta. From the collection of river fishes made at Nawabgunge at different seasons some light was thrown on the movements of the young *Hilsa* in the river

¹ Those who have had occasion to taste the flesh of *Hilsa* from the rivers of Bengal and also from those of Bihar and the U.P. have told me that the up-country *Hilsa* is a very poor fish. On account of the large number of small bones it rarely finds favour with the better class of people in the U.P.

Hooghly. We found that large quantities of very young *Hilsa*, some as small as 35 to a tola in weight, are caught in the Hooghly during November to February; the size of the specimens obtained at Nawabgunge, however, increased month after month (*vide* Table II, p. 111) showing thereby that the progeny of the individuals that spawned higher up was passing down to the sea.

At Pulta we also investigated the food of the species from the young to the adult stage and found it feeding on planktonic



Text-fig. 6.—Lower half of first left gill-arch of a young specimen of *Hilsa ilisha* (Hamilton). $\times 2\frac{1}{2}$. (Copied from *Rec. Ind. Mus.*, XL, p. 155, 1938).

The actual number of gill-rakers on this portion of the gill-arch was 156, but 95 could be shown in the drawing.

organisms. A study of its branchial arches showed that they are definitely adapted for straining microscopic life: its gill-rakers are setose, long, slender and close-set, and act like a sieve.

Having obtained some information regarding the life-history of *Hilsa* from our studies at Pulta and at Nawabgunge on the river Hooghly, ***Hilsa* Investigations in Eastern Bengal, etc.** we extended our observations to other rivers of Bengal and those of the neighbouring provinces. Our first attempt was to elucidate the fishery of the *Jatka* fish of Eastern Bengal to which Finlow had referred in his reports mentioned above. In February 1939, Mr. M. N. Datta of the Zoological Survey of India visited Barisal, Patuakhali, Galachipa, Chandpur, Narayangunge and Goalundo, but he was not able to collect any definite information regarding *Jatka*. However, among the specimens collected by him at various places we found young *Hilsa* (*vide* Table III, p. 111) from 1 to 5 inches in length which clearly showed that, as in the River Hooghly, the fish breeds in the rivers of Eastern Bengal throughout the year. Mr. Datta found extensive fishing for young *Hilsa*, 7 to 11 inches in length, at Goalundo, Narayangunge and Chandpur. In 1940, through the kind interest of the District

authorities, several consignments of *Jatka* were received from Lakshmipur, Narayangunge and Dacca. Our detailed studies on the taxonomy, size and food of these specimens have definitely established that *Jatka* represent the young of *Hilsa* 2 to 5 months old, that the migration of *Jatka* from the estuaries into freshwaters is for feeding purposes, and that during the *Jatka*-phase, the fishery of which lasts from February to April, the *Hilsa* feeds and grows until April-May when the feeding stops and the growth is inhibited. It is remarkable that the *Jatka* disappears from the rivers as suddenly in April-May as it reappears in them in February-March. The significance of *Jatka* in the fishery of *Hilsa* will be discussed later.

Through the kindness of Professor D. R. Bhattacharya we have obtained young, half-grown, and adult specimens of *Hilsa* from Allahabad (*vide* Table IV, p. 111), and through the courtesy of Mr. Stanley Howard a very young specimen from a tributary of the Mahanadi River in the Patna State (*Statesman*, Calcutta, 18th October, 1940). The Madras Fisheries Department found the young of *Hilsa* in the rivers of Madras and made valuable observations on the rate of growth and life-history of the species. It has now been definitely established that the swarming of the mature *Hilsa* into the rivers during the flood season is mainly for spawning purposes, but a number of young individuals also ascend and these travel far inland before they become sexually mature. Thus we get *Hilsa* breeding throughout its range both in the tidal waters and in the middle reaches of the large rivers. Though a number of specimens of *Hilsa* can always be found in the rivers, the floods and the sexual maturity of the migrants seem to induce the swarming *Hilsa* in the sea to undertake the upward journey into the rivers.

Having located the spawning grounds of *Hilsa* and its mode of life in rivers, our next attempt was to get some idea of its wanderings in the sea. Here again fortune favoured the Zoological Survey of India. In February-March 1939, a party of the Department in the course of its investigations on the fauna of the Balasore Coast at Chandipore found extensive catches of *Hilsa* from the sea in *Ber* fishery. Later it was found that O'Malley in the Gazetteer for Balasore District had already recorded that extensive *Hilsa* fishing is carried out in the sea along the coast. He observed:

"The fishermen are particularly keen in their pursuit of the *hilsa*, and a flotilla of sea-going craft will sometimes drift along together for days, awaiting the approach of a shoal of that fish. When the shoal arrives, they at once fill their boats, steer straight for shore, and convert their haul into *sukhua* or sun-dried fragments of fish—a favourite relish with the Oriyas."

These observations led us to consult all earlier works on *Hilsa* very carefully and we were rewarded by finding several

references to *Hilsa* in the sea. Further, it became clear that along the coasts of Bengal and Orissa and in the estuaries young *Hilsa* about 7 to 10 inches in length were fished extensively during the cold months. We arranged to get samples of *Hilsa* from Chandipore every month from which our tentative conclusions are that *Hilsa* in all stages of growth are found in the sea all along the foreshore in the shallow waters of the Bay of Bengal, that most of the specimens caught in November are less than one year old, and that the fish feeds and continues to grow in the sea except during November and February and possibly during May-June also.

The earlier records of the occurrence of *Hilsa* in the sea and the results of the enquiries made by us from the officers in charge of the Pilot Vessels stationed not very far from the mouth of the river Hooghly (Plate 6) leave no doubt that after leaving the rivers the fish do not go far into the sea but move about in shoals in the estuaries and the foreshore. The fish lives in shallow waters and has not yet been recorded from waters more than a few fathoms deep.

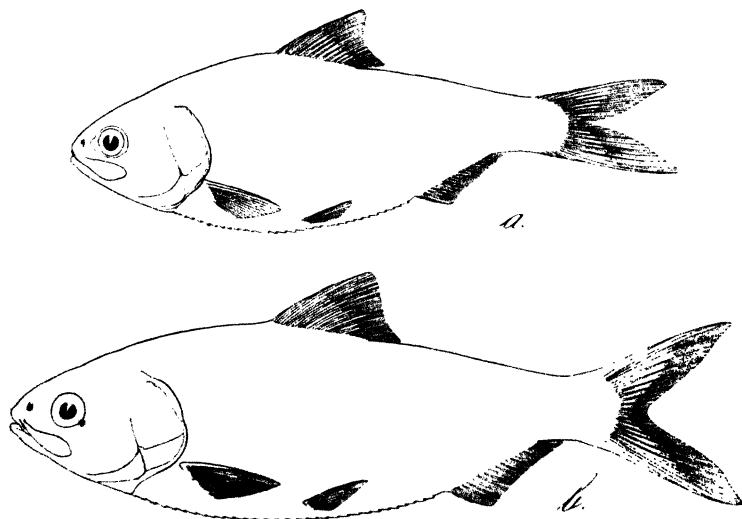
Though our observations are yet inadequate and inconclusive for any fishery forecasts, we can confidently claim that an advance has been made in our knowledge of the life-history and wanderings of *Hilsa*. For instance, we definitely know that the spawning grounds of *Hilsa* are in our rivers and that the young of one to three inches in length are caught in the rivers in basketfuls during the months of November to February to be sold at the rate of 6 pice per seer. Again during the cold weather, shoals of this fish about 7 to 9 inches long are caught in the estuaries and along the foreshore. In February-March there is an extensive fishery of *Jatka* in the rivers of East Bengal, and then during the monsoon floods mature fish swarm up the rivers and yield us our most valuable *Hilsa* fishery. In the circumstances detailed above it is a wonder why the fish has not been totally exterminated so far, for we have devised extensive fisheries of the species in all stages of its growth and in all places where it wanders from season to season. I shall now attempt to discuss the causes that have saved this species from total destruction.

In the olden days, the Hindus of Bengal did not eat *Hilsa* from the last day of the Durga Puja, usually at the end of September or at the beginning of October, to the Sri-panchmi day, at the end of January or the beginning of February, or in other words a close season of about three and a half months was observed. This is the period when the main swarms of *Hilsa*, after spawning in the rivers, go back to the sea to recuperate and fatten for the next spawning season and their young move down to the sea in large numbers. During these phases the fish is of poor quality and hardly worth eating. But owing to the

pressure of increasing population on the food resources of the country and to the so-called advanced modern education, the people now ignore this injunction as a piece of superstition. In all important fisheries, a close season is observed all over the world and there is no reason why the old practice that has probably helped to preserve the fishery to a certain extent, may not be revived. Though during the season all possible means are adopted by the fishermen to entrap swarms of *Hilsa*, many still escape to propagate the race. Even one adult pair, under suitable conditions, can produce tens of thousands of young ones. As the eggs sink to the bottom and the fry start their seaward journey soon after hatching they escape destruction and reach the sea when the rivers are still in floods. Thus natural protection is afforded to the fry during rains. As pointed out already, *Hilsa* fry are caught in the rivers when the waters fall low in November-December and it becomes possible to use fine-meshed nets at the bottom. During nor'westers also the young of *Hilsa* are left alone because the weather conditions are not favourable for using fixed bottom nets. Nature has thus made some provision for the protection of the young, but how far the greed of man will allow it to remain effective, it is difficult to say. In the light of the above remarks, it is imperative, however, to consider the question of devising protective measures for the conservation and proper exploitation of this important fishery.

In his recommendations, the late Sir K. G. Gupta thought of this eventuality and suggested that *Hilsa* hatcheries not required. hatching stations may be opened for the artificial propagation of the species with a view to replenish the depleted rivers of Bengal. In this connection it must be remembered that, besides the question of heavy cost, the greatest output of a series of hatcheries would be but a trivial fraction of the output from a relatively small number of natural spawners. So true is this that in many advanced countries, in trying to maintain salmon in streams, the authorities have stopped hatchery work and are concentrating on helping the spawning fish to get on to the natural spawning beds. From what I have seen and learnt of the *Hilsa* fishery, I am definitely of the opinion that even now there are plenty of fry, but the great problem is to devise a way to protect the young *Hilsa* so that a due proportion may reach maturity and spawn. I have shown that at present very young *Hilsa* of about 1 to 3 inches in length are caught in basket-loads during November to February, young of about 6 inches in length, known as *Jatka*, are caught in millions in the rivers of Eastern Bengal during February-March-April and throughout the cold season young fish of 7 to 9 inches are caught in boat-loads in the estuaries and along the foreshore. The fishery of young *Hilsa* at all these

stages leads to the depletion of the natural stock. With the increasing demand for fish, there will be a corresponding activity in catching fish of all sizes. However, in legislating for regulating the relatively unproductive fishery of the young, some alternate mode of subsistence will have to be found for the fishermen, otherwise, it may mean great hardship to those poor people. In view of the abundance of young *Hilsa* in Bengal waters, there is hardly any necessity for establishing *Hilsa* hatcheries. All the same the question of the *Hilsa* fishery in Bengal is of such vital importance that it requires very thorough investigation before any remedial measures can be suggested. For instance, in reviewing our *Hilsa* investigations, European and American Likelihood of experts have surmised, on the analogy several Races of of Herring-fisheries in European waters, *Hilsa*. that there may be different races of *Hilsa* which breed under different environmental conditions. Our

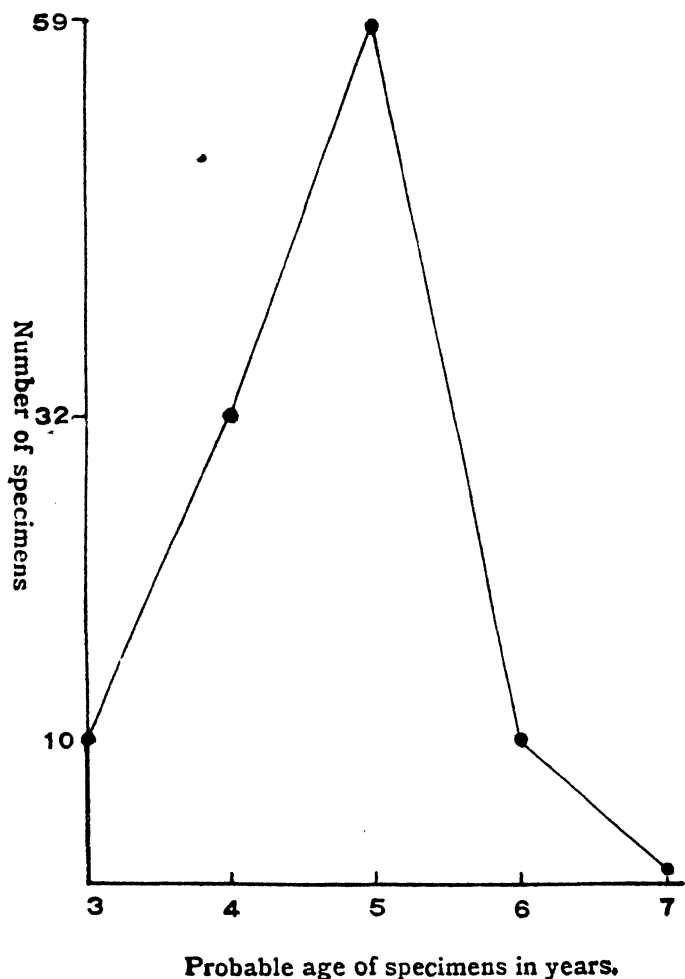


Text-fig. 7.—Two forms of *Hilsa ilisha* (Hamilton) as judged by the depth of the body and the form and size of the head.

a. East Bengal form. Length 124 mm.; b. Hooghly river form from Pulta. Length 150 mm.

investigations also indicate the possibility of our having several races or varieties of *Hilsa* in Indian waters, and though we are making every possible effort to elucidate this point, with the limited means at our disposal, it will take considerable time to get together the necessary material and to make the requisite biological observations. The *Hilsa* fishery is really a very vast problem.

Sir K. G. Gupta, in the course of his enquiries, received complaints from all directions that the supply of *Hilsa* was on the decline. But all of us are aware that *Hilsa* was most abundant in 1934, the year of the Bihar



Text-fig. 8.—Graphic representation of the probable age of 112 specimens of *Hilsa ilisha* (Hamilton) imported into Calcutta from Goalundo during June-July, 1939. (Copied from *Rec. Ind. Mus.*, XLII, p. 48, 1940).

earthquake, and in 1939. It has been suggested that there is a five year cycle in the fishery of this species. From the authorities

of the A. B. Railway at Chandpur, I have been able to obtain valuable data (*vide* Table V, p. 112) regarding the booking of *Hilsa* fish to principal stations on the A. B. Railway for the years 1937, 1938, 1939 and 1940. I was also informed that the season for *Hilsa* generally starts from April and continues up to October. The figures in the table show great annual fluctuation in the fishery and also fluctuations from month to month. If future observations bear out our assumption regarding the five-year cycle in the fishery of *Hilsa*, it will be the duty of persons interested in the welfare of the masses to see that the catches of the fishermen during such periods are properly preserved so that they can be utilized during the lean years of the fishery. In 1939, the *Hilsa* fish was so plentiful in Bengal that tons of fish were allowed to go waste in Eastern Bengal, for there was no one to purchase them. If proper arrangements¹ had been made in the form of having a floating cannery, which could be moved from place to place, the problem of finding a considerable quantity of canned fish or fish oil would not trouble anybody now.

In Europe and America, it has now been ascertained definitely that "Annual fluctuations in the abundance of a fish may be very great. One year may be exceptionally favourable, with production far above normal, to be followed perhaps by several years of scarcity; and it is not uncommon to find that fish belonging to one year class are fifty times as numerous as those of another. These great fluctuations, which are the foundation on which fishery prediction is based, are for the most part to be attributed to events which happened in the early months of the fish's life; and when we consider the manifold perils, meteorological, physico-chemical and biological, to which the eggs and larvae of a marine animal are subject, it is little wonder that there may be such great differences from one year to another, nor is it a matter for surprise that the precise reasons for good and bad spawning seasons are as yet unknown." (S. W. Kemp, Presidential Address. Zoology Section. Brit. Ass. Adv. Sci. 1938). In the case of *Hilsa*, though considerable advance has been made in our knowledge of its bionomics and life-history,

Scientific Exploitation of the Fishery urged.

a great deal still remains to be done by a band of expert scientists to put its fishery on a scientific basis. It is for the elucidation of these and similar other problems that the establishment of a well-equipped and suitably staffed fishery department in this province is absolutely essential. The economic value of *Hilsa* to this province is so great that its fishery alone may form the subject for investigation by a commission.

¹ Fisheries in India suffer mostly for two reasons—lack of transport facilities and the primitive methods adopted by fishermen in preserving their catches. Fortunately we have still extensive fisheries which can yield valuable food supply, if properly exploited.

BIBLIOGRAPHY.

- ANON, 1940.—Indian Fishes of economic value. *Nature*, CXLVI, pp. 657, 658.
- CUVIER, G. and VALENCIENNES, A., 1847.—*Histoire Naturelle des Poissons*, XX, p. 433.
- DAY, F., 1873.—*Report on the Sea Fish and Fisheries of India and Burma*, pp. 24, 25 and App. pp. i, xxxi, cxxi, cxxii.
- DAY, F., 1873.—*Report on the Freshwater Fish and Fisheries of India and Burma*, pp. 22, 23, 35, 36.
- DAY, F., 1878.—*Fishes of India*, pp. 638, 640.
- DAY, F., 1889.—*The Fauna of British India including Ceylon and Burma*. Fishes, I, pp. 376, 377.
- DE, K. C., 1940.—*Report on the Fisheries of Eastern Bengal and Assam*, pp. 17, 18.
- DEVANESEN, D. W., 1939.—Research Work on the *Hilsa*. *Curr. Sci.*, VIII, p. 126.
- EVANS, G., 1921.—*Annual Report of the Department of Fisheries, Bengal and Bihar and Orissa, for the year ending 31st March 1921*, p. 3.
- EVANS, G., 1922.—*Annual Report of the Department of Fisheries, Bengal and Bihar and Orissa, for the year ending 31st March 1922*, p. 2.
- FINLOW, R. S., 1920.—*Annual Report of the Department of Fisheries, Bengal and Bihar and Orissa, for the year ending 31st March 1920*, p. 3.
- FINLOW, R. S., 1923.—*Annual Report of the Department of Fisheries, Bengal and Bihar and Orissa, for the year ending 31st March, 1923*, p. 2.
- FINLOW, R. S., 1933.—Director of Agriculture's Note on the Scheme for the Reorganisation of a Fishery Department of Bengal, p. 5.
- GUPTA, K. G., 1908.—*Reports on the Result of Enquiry into the Fisheries of Bengal and into the Fishery matters in Europe and America*, p. 92.
- GUPTA, K. G., 1911.—Extract from the Final Report of the 27th January 1908, regarding fishery matters. *Coll. Papers Fish. Surv., Bay of Bengal*, pp. 15-18.
- HAMILTON, F., 1822.—*An account of the Fishes found in the River Ganges and its Branches*, pp. 243-246, pl. xix, fig. 73.
- HORA, S. L., 1938.—A preliminary Note on the Spawning Grounds and Bionomics of the so-called Indian Shad, *Hilsa ilisha* (Ham.) in the River Ganges. *Rec. Ind. Mus.*, XL, pp. 147-158.
- HORA, S. L. and NAIR, K. K., 1940.—Further Observations on the Bionomics and Fishery of the Indian Shad, *Hilsa ilisha* (Ham.) in Bengal Waters. *Rec. Ind. Mus.*, XLII, pp. 35-50.
- HORA, S. L. and NAIR, K. K., 1940.—The *Jatka* fish of Eastern Bengal and its significance in the Fishery of the so-called Indian Shad, *Hilsa ilisha* (Ham.). *Rec. Ind. Mus.*, XLII, pp. 553-565.
- HOWARD, S., 1938.—*The Statesman*, Calcutta. Town Edition. (7th Nov.).
- JENKINS, J. T., 1910.—Notes on Fish from India and Persia, with descriptions of new species. VII.—The spawning of the *Hilsa*. *Rec. Ind. Mus.*, V, pp. 138-140.
- JENKINS, J. T., 1911.—Report dated the 24th December 1909 on the Marine Fishery Investigations of the Bengal Government Steam Trawler "Golden Crown" 1908-1909. *Collection of Papers dealing with the Fishery Survey of the Bay of Bengal*, p. 55.
- JENKINS, J. T., 1938.—Spawning of *Hilsa*. *Curr. Sci.*, VII, pp. 251, 252.
- JENKINS, J. T., 1940.—*Hilsa* Investigations in Bengal. *Curr. Sci.*, IX, pp. 241, 242.
- LUARD, C. BEKFOR and HOSTEN, H., 1927.—*Travels of Fray Sebastien Munrique, 1629-1643*, II, pp. 230, 232.
- MAKWELL, F. D., 1911.—*Report on Inland Fisheries in the Thongwa, Myaungmya and Bassein Districts*, pp. 61-196.

MOJUMDAR, C. H., 1939.—Culture of Hilsa. *Modern Review*, pp. 293–295.

MOJUMDAR, C. H., 1939.—Foreshore Fishing in the Eastern Part of the Bay of Bengal. *Science and Culture*, V, p. 219.

NAIR, K. K., 1939.—On some early stages in the development of the so-called Indian Shad, *Hilsa ilisha* (Hamilton). *Rec. Ind. Mus.*, XLI, pp. 409–418.

NAYUDU, M. RAMASWAMI, 1920.—A Statistical Analysis of an In-shore Fishing Experiment at Madras, 1919. *Madras Fisheries Department Administration Report for 1918-19*, p. 129.

O'MALLEY, L. S. S., 1907.—*Bengal District Gazetteers, Balasore*, p. 14.

PRASHAD, B., 1919.—*Annual Report of the Department of Fisheries, Bengal and Bihar and Orissa for the year ending 31st March 1919*, p. 4.

PRASHAD, B., HORA, S. L., and NAIR, K. K., 1940.—Observations on the Seaward Migration of the so-called Indian Shad, *Hilsa ilisha* (Ham.). *Rec. Ind. Mus.*, XLII, pp. 529–552.

RAJ, B. SUNDARA, 1917.—On the habits of the *Hilsa* (*Clupea ilisha*) and their artificial propagation in the Coleroon. *Journ. Proc. Asiat. Soc. Bengal* (N.S.), XIII, p. clxxxiv.

RAJ, B. SUNDARA.—*Madras Fisheries Department Administration Reports for 1930-31*, p. 32 (1932); 1933-34, p. 41 (1934); 1934-35, p. 38 (1936); 1935-36, pp. 37, 38 (1937) and 1936-37, p. 34 (1938).

REGAN, C. TATE, 1917.—A Revision of the Clupeoid Fishes of the Genera *Pomolobus*, *Brevoortia* and *Dorosoma*, and their Allies. *Ann. Mag. Nat. Hist.* (8), XIX, p. 304.

RUSSEL, PATRICK, 1803.—*Description and figures of Two Hundred Fishes collected at Vizagapatam on the Coast of Coromandel*, pp. 77, 78.

SOUTHWELL, T., 1914.—Report on Hilsa-hatching operations conducted at Monghyr, Bihar, during August, September and October 1912. *Bull. Dept. Fisheries, Bengal, Bihar and Orissa*, No. 4, pp. 1–5.

SOUTHWELL, T., 1918.—*Annual Report of the Department of Fisheries, Bengal and Bihar and Orissa for the year ending 31st March 1918*, p. 4.

SOUTHWELL, T. and PRASHAD, B., 1918.—On Hilsa Investigations in Bengal, Bihar and Orissa. *Bull. Dept. Fisheries, Bengal, Bihar and Orissa*, No. 11, pp. 6, 12.

WILSON, H. C., 1909.—Artificial propagation of hilsa in the Coleroon. *Govt. of Madras, Revenue Dept. G. O. No. 1219* (5th May).

TABLE I.

Table of Measurements of 900 Young Hilsa collected from the Pucca Settling Tank No. 4 on 21st November 1937, arranged in 10 mm. Difference groups.

Number of specimens.	Measurements in millimetres.			
1	57
7	80–89
72	90–99
56	100–109
52	110–119
32	120–129
97	130–139
273	140–149
220	150–159
74	160–169
14	170–179
2	180–189

TABLE II.

Length in mm. of young Hilsa collected at Nawabgunge.

Date of collection of samples.	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99
30th October, 1938	204	153	3	..	..	..	..	..
13th to 15th November, 1938	5	42	78	4	2	..	..	..
27th February and 1st March, 1939	..	..	8	45	22	3	3	1

TABLE III.

Young Hilsa from East Bengal collected in February 1939.

Length in millimetres.	Number of specimens collected at			
	Gazalia (River).	Galachipa (River).	Patua-khali (Market).	Narayan-gunge (Market).
30-39	..	..	3	..
40-49	..	..	20	..
50-59	..	1	30	..
60-69	..	..	29	6
70-79	..	..	33	3
80-89	1	..	6	2
90-99	..	1	2	..
100-109	4	3	4	..
110-119	10	7	18	..
120-129	2	11	17	..
130-139	1	2	4	..

TABLE IV.

Young Hilsa collected at Allahabad by Professor D. R. Bhattacharya on or about the 20th June, 1940.

Standard length in millimetres.	Number of specimens.
53	1
58	1
59	1
60	1
61	1
62	2
64	3
65	1
66	1
69	1
74	1

TABLE V.

Figures in maunds of Hilsa exported from Chandpur from April to October during 1937, 1938, 1939 and 1940.

Name of month	1937.	1938.	1939.	1940.
April	954	198	1,359	1,288
May	1,364	265	2,517	1,331
June	3,300	879	8,544	4,401
July	2,697	1,709	5,268	4,137
August	985	1,380	2,003	1,630
September	1,708	1,936	3,675	5,117
October	1,232	1,633	2,786	4,230
TOTAL	12,240	8,000	26,152	22,134

EXPLANATION OF PLATES.

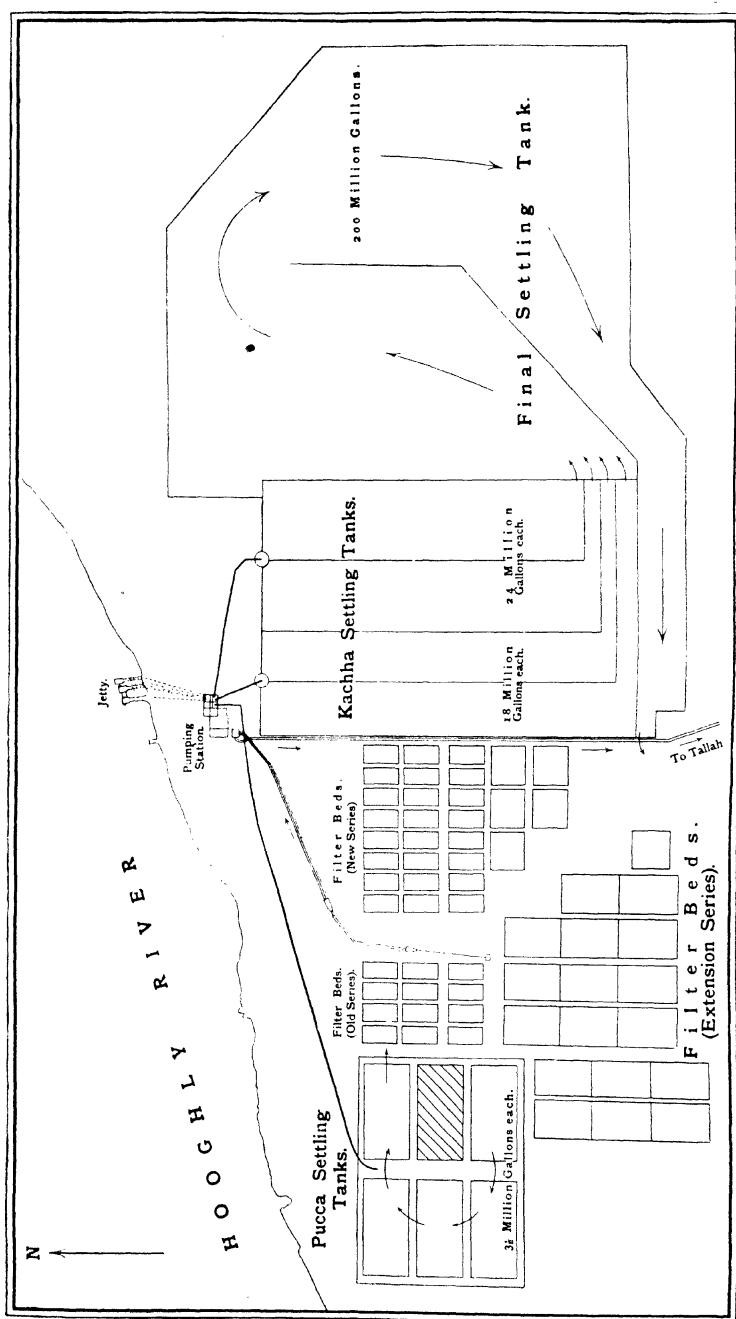
Plate 5.

Site plan of Calcutta Corporation Waterworks, Pulta.

Plate 6.

A map of Sandheads and the Balasore Coast. The five, ten and twenty fathom depth zones are indicated by different types of hatched lines. (Copied from *Rec. Ind. Mus.* XLII, pl. ix, 1940).

From the abundance of *Hilsa* shoals in the shallow flats close to the river mouths and their neighbourhood on the Bengal and Balasore Coasts and their probable absence from the area round Pilots Ridge it is surmised that this species in its seaward migration does not go far out into the sea.



SITE PLAN OF PULTA WATER WORKS.

of sums, while the latter deals with all sorts of arithmetical problems demanding the exercise of reasoning. This, by no means, however, implies that the two parts are mutually exclusive.

When a child works out a problem sum, his mental process involves, in the first place, his powers of comprehension, analysis, synthesis, assimilation, judgment, etc., all of which may be put under the term, reasoning, as is popularly conceived. In the second place, this conscious process of reasoning brings into play a train of habit-bonds, more or less automatic, which the children must have built up earlier in course of their drilling in tool arithmetic. Thus, arithmetical ability that functions through problem sums involves children's power of reasoning as well as their skill in mechanical computation.

My present investigation being a study of arithmetical abilities through problem sums, I made, at the outset, a tentative selection of about a hundred such sums from all topics of arithmetic that are taught to the four top classes of a High School. Utmost care was taken to see that the problems were as easy as possible. Six graduates were then engaged, one at a time, in working out these sums at their normal speed, and in every case the time taken for each sum was carefully reckoned in seconds by means of a stop-watch. The average number of seconds thus required for each sum was next calculated and those sums that took comparatively less time than others and also were found fairly representative of the whole 'problem' part of arithmetic were retained and the rest discarded. Thus were left thirty problem sums as listed below:—

ARITHMETICAL REASONING.

1. Two-thirds of a class consist of 20 boys. How many boys are there in the class?
2. Find the cost of 12 chairs at Rs.5-8 per pair.
3. A carpet 20 ft. by 15 ft. cost £10. What was the cost per square yard?
4. Ram is as old as Mohan; Mohan is twice as old as Rahim; Rahim is as old as Hari. If Hari is 5 years old, how old is Ram?
5. I want equal numbers of stamp and post card for Rs.1-5. If a stamp cost one anna and a post card 9 pies, what will be the number of each?
6. How many men can do a piece of work in 12 hours which 4 men can do in 18 hours?
7. A man takes 20 minutes to walk from his house to the station. His son also takes 20 minutes. How long will it take them if they both walk together?
8. What is the greatest number that will divide 64 and 76, and leave a remainder 4 in each case?
9. The area of the floor of a room is 196 square feet. What is the sum of its four sides?
10. If mango sells at the rate of Rs.3-2 per 100, how many can I buy for 7as.?
11. The distance round the wheel of a motor-car is 3 ft. 6 in. How many times does the wheel go round in travelling 140 yd.?

12. Find two numbers whose sum is 19 and whose difference is 5.
13. The area of a field twice as long as it is broad is 200 sq. yd. Find its sides.
14. How many times can I subtract 3 from 73?
15. What is the length of a stick which I can cut up into 8 pieces, each 6 in. long and have 4 in. left over?
16. A man aged 35 years is 7 times as old as his son; how many times as old as his son will he be 25 years hence?
17. At what rate per cent, simple interest, would Rs.10 amount to Rs.11 in 4 years?
18. Rs.9-11 is made up of equal numbers of Rupees, eight-anna, four-anna, two-anna and one-anna coins. Find the number of each.
19. I buy some articles for Rs.40; what must I sell them for, so as to gain 20%?
20. If $\frac{2}{3}$ of a piece of cloth cost Rs.3-6, what is the cost of the whole piece?
21. After spending half of my money and then half of the remainder I had 2 annas left. How much had I at first?
22. Divide Rs.30 between A and B so that their shares may be proportional to 6 and 4.
23. What is the least number which must be subtracted from 45 to make it exactly divisible by 7?
24. What two whole numbers multiplied together make 11?
25. There are two numbers one of which is greater than the other by 4. When multiplied together they make 165. What is the smaller one?
26. If telegraph poles stand 50 yd. apart in a straight row, what is the distance from the first to the eighth?
27. 3% of A's income is the same as 15% of B's. A's income is Rs.300 a year. What is B's?
28. A brick weighs 7 lb. and half its own weight. What is the weight of the brick?
29. If a man's salary is Rs.80 a month and he spends Rs.56 a month, how long will it take him to save Rs.600?
30. If 2 pencils cost 5 pice, how many pencils can you buy for 50 pice?

The average time taken for doing each sum being not much, each was given 1 mark as its weight. This does not mean, however, as will be presently seen, that the difficulty values of these problems were the same for the school pupils for whom the test was standardized.

The test was now printed and administered to 73 graduates and 1,520 High School students at Patna during the months of September and October, 1939, under my personal supervision, and uniform conditions were observed throughout. Eight schools of different types were selected for the test in order that the samples might be fairly representative of the 'population'. Exactly half an hour was given to each group of subjects to answer the questions and in the case of Class VIII these were translated into Hindustani and Bengali, which were introduced as media of instructions from 1939, beginning with that class. The students were asked to work out the sums 'in their head' or on scrap papers if they so liked and were told to put down their answers at the end of the questions. Every step was taken to secure normal and independent responses of the subjects, who were strictly prevented from using any unfair means whatsoever.

The marking of the answers was now a simple affair. The questions whose answers were correct were tick-marked and counted, and then the totals were put down at the bottom of the question papers. The services of some pupil teachers of the Patna Training College were requisitioned at this stage of work. After the students' responses were thus measured, their 'point-scores' were dealt with statistically, class by class, with the result as shown by Table 1 below:—

TABLE 1 (*Patna*).

	Q_1	Median	Q_3	Mean	σ	Skewness
Graduates ..	19.6	23.6	26.3	22.3	5.4	— .72
Class XI ..	12.5	16.6	21	16.8	5.7	+ .10
Class X ..	9.5	13.7	17.1	13.6	5.5	— .05
Class IX .	7.3	10.3	14.8	11.2	5.1	+ .53
Class VIII ..	6.3	9.7	13.3	10	5.0	+ .18
Classes IX and VIII combined ..	6.8	10	14	10.54	5.1	+ .32

N.B.— Q_1 = First Quartile.

Q_3 = Third Quartile.

σ (sigma) = Standard Deviation.

Next year the test was translated and printed in Bengali and administered to 884 boys in three High Schools selected at random, in Calcutta, during the month of May. Exactly the same process was gone through in regard to the collection of data, measurement of scores, tabulation of figures, etc., as was done in the case of Patna students. The corresponding table is given on the next page.

The norms or pass standards for the test were now easily deduced from the above tables by making a compromise between the mean and the median for each class and by leaving out the decimals. Thus the norms are as follows:—

Patna classes ..	..	XI	X	IX	VIII
Calcutta classes ..	..	X	IX	VIII	VII
Norms ..	..	16	13	10	9

This means that a student of average merit should correctly answer 16 questions if he belongs to the topmost class, 13

TABLE 2 (*Calcutta*).

	Q_1	Median	Q_3	Mean	σ	Skewness
Class X ..	12	16.2	22.3	16.1	5.5	-.05
Class IX ..	9.3	13.1	17.3	13.5	5.3	+.22
Class VIII ..	6.3	9.2	12	9.6	4.3	+.28
Class VII ..	5.5	8.7	11.8	9.5	5.6	+.43
Classes VIII and VII com- bined ..	5.9	9	11.9	9.57	5.0	+.34

questions, if he belongs to the next lower class and so on, provided that all the conditions of the test including the time of the year are strictly observed. It may be noted here that a psychological test of achievement to be really scientific and effective should be standardized on the age-norm rather than on the grade-norm basis as the present test is. But as the information about the students' chronological ages required for the age-norm basis was not thought to be accurate enough for a strictly scientific enquiry I had to confine myself to the calculation of the grade-norms alone.

Before the test is considered as standardized for the Secondary Schools of both Bihar and Bengal we must show that it satisfies a number of statistical criteria. A good test is judged mainly from its validity, reliability, objectivity and ease of administration and scoring.

The two criteria, reliability and validity, refer to different aspects of what is essentially the same thing, namely, test efficiency. But the test efficiency is impossible of attainment unless the samples with which the test is standardized are representative or adequate in character. So, let us first see if our samples are really representative.

One of the simplest tests of the representativeness of a sample consists in drawing from the 'population' more than one groups of fairly large size. If the measures of central tendency, variability, etc., calculated from these groups are of nearly the same magnitude, we may be reasonably assured that our sample is representative. A glance at Tables 1 and 2 clearly indicates that (i) the quartile, median and mean measures of the arithmetical abilities of the two groups of students tend to be equal to one another, class by class, (ii) these measures, again, increase in the same manner from the lowest to the highest class, (iii) the

standard deviations from the mean tend to remain constant, and (iv) the skewness of the distributions is insignificant in the higher classes but is quite prominent in the lower.

When we scrutinize the figures in the first four columns of the tables more closely, we find that the measures for the Calcutta students fall slightly short of those for the Patna students in the higher forms and markedly short in the lower forms. The reasons for this general deviation will be quite clear when we remember that the test was applied to the Calcutta Schools four or five months earlier in the Session than in the case of Patna, and that only three schools were tested in Calcutta as against eight at Patna. I am sure that the difference would not have arisen had the conditions regarding the time of test and the number of schools remained the same at both the places. If, however, we allow to the Calcutta figures .5 to 1 marks for this emergency, the measures in question will be exactly the same in the higher classes and almost the same in the lower. Thus we see that the two groups of samples tell almost the same story and so we may safely say that they are representative of the 'population' from which they were drawn.

The validity of a test or other measuring instrument is determined *directly*, where possible, by finding the correlation between the test and some independent criterion. Such a criterion must be a highly objective measure in terms of which the value of the test is estimated. But the difficulty is that we are not able to secure independent measures of abilities that are recognized as highly accurate. We are, therefore, compelled to study the validity of most tests by methods which are *indirect*.

One of the indirect methods of validating a test is to rely upon the independent opinions of competent judges, and still another is to see if the statistical results agree with our expectations. Both these methods were employed to validate our present test.

The teachers in charge of mathematics in one of the schools at Patna, immediately after it was tested by us, were asked to supply me with twelve names of boys in each class ranked in order of merit such that four of them would be the best, four mediocre and four worst, in their independent opinions. These groups of boys were next ranked on the basis of my test and the correlation co-efficients were calculated by means of the method of 'Rank Differences' with the result that these were found to range from .78 to .92. The validity, therefore, is highly satisfactory on this count.

Next let us consider how far the findings of our test tally with expectations. In regard to a test in which the exercises are of varying difficulty values as they will appear to be in our present test, the test-makers have made two important assumptions (W. S. Monroe's *Theory of Educational Measurements*, pages 92, 145-46). First it is assumed that when an unselected

group of pupils, such as those belonging to a given school grade, is distributed according to a given ability, a 'normal distribution' is secured. The second assumption is that the variability of this distribution remains the same for successive school grades. Prof. Monroe says that these assumptions appear to be approximately in agreement with available data. A corollary to the first assumption, which too has been found to agree with facts, is that if the test of this nature is applied under the same conditions to groups of subjects of varying degrees of ability to be measured, the distribution will be negatively skewed or 'loaded' at the high score end in the case of the advanced group, positively skewed or loaded, at the low score end in the case of subjects of lower ability and normal for the rest. The findings of our test tell exactly the same story. At Patna, the test was applied to 73 graduates and the resulting distribution was found to be negatively skewed or heaped at the high score end. The combined distributions for the two top classes of both Patna and Calcutta students or those for them singly are found to be almost exactly normal or symmetrical; while the corresponding distributions for the two lower classes are clearly piled towards the low score end.

The first of the above facts will be sufficiently clear to the reader from Table 1, where the skewness calculated from the graduates' group is shown, and it is as high as $-.72$. The other two facts will be vivid to the eye from Table 3 and also from the three graphs that follow, showing the relationship between the 'obtained' distributions and the 'best fitting' normal curves.

TABLE 3.

Calcutta Classes	Q_1	Median	Q_3	Mean	σ	Skewness
X and IX . .	10.4	14.7	18.8	14.86	5.5	+ .09
VIII and VII	5.9	9	11.9	9.57	5.0	+ .34
Patna Classes						
XI and X . .	10.7	15	18.9	15.07	5.78	- .03
IX and VIII	6.8	10	14	10.54	5.1	+ .32

In each of the following figures the obtained frequency distribution has been plotted in histogram and the 'ideal' normal curve has been drawn on the same axis of reference and of the same area,

mean and σ (sigma), in order to bring out clearly the relationship between the two.

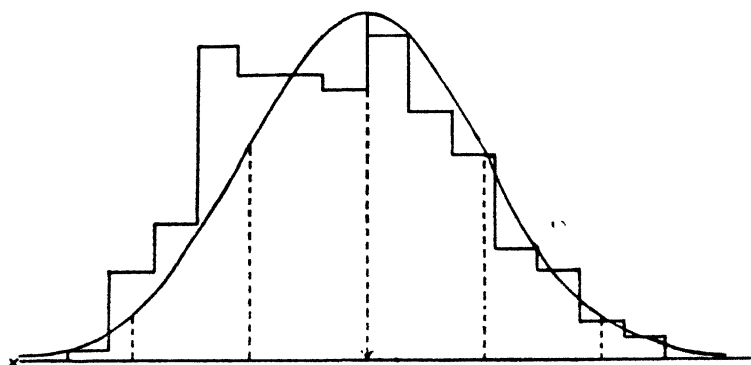


FIG. 1.

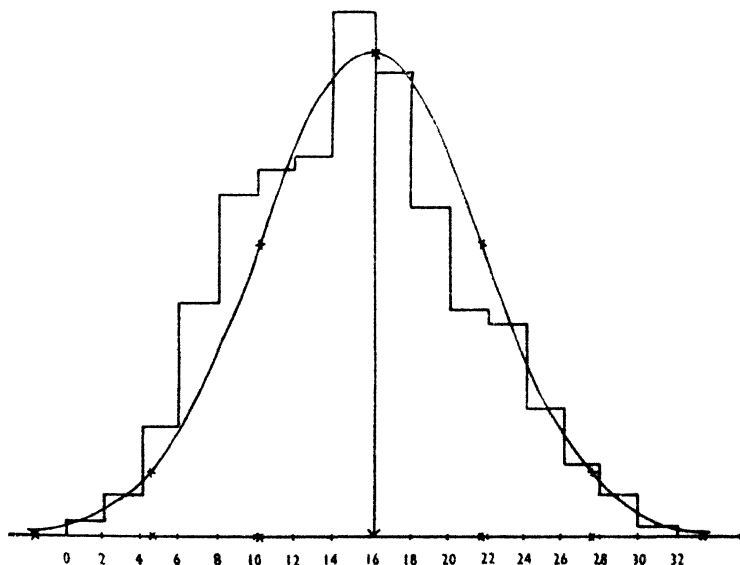


FIG. 2.

The χ^2 (chi-square) test being much too laborious, I have used this short-cut device to judge the 'goodness of fit by eye' and I think, this is quite useful for our purpose. To determine the theoretical curve in each case the ordinate at Y_0 ($X = 0$)

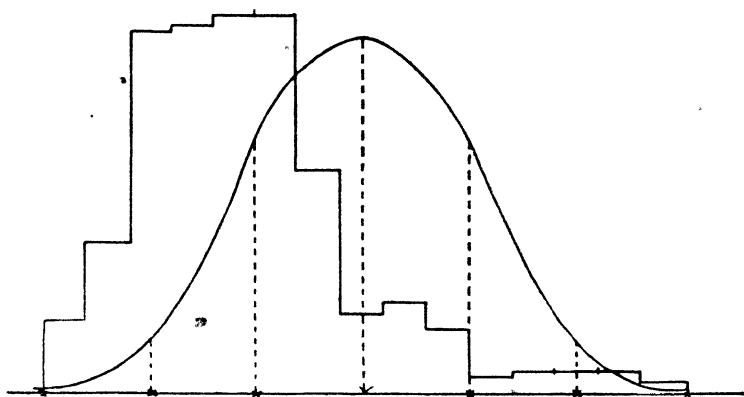


FIG. 3.

was discovered from the equation of the Normal Probability Curve

$$Y = \frac{N}{\sigma\sqrt{2\pi}} e^{-\frac{x^2}{2\sigma^2}}$$

and then the ordinates at $\pm\sigma$, $\pm2\sigma$, $\pm3\sigma$ (in units of step-intervals) were calculated from the table concerned (Garret's *Statistics in Psychology and Education*, pp. 125-127). The end-points of these ordinates were then joined by means of suitable lines to form the curve required.

From the first two figs. it would appear that the distributions tend to be normal, whereas the third fig. clearly shows that the distribution is far from being such. So, the first of Monroe's assumptions and its corollary fully agree with our findings and therefore one of the expectations comes true.

The reasons for the above phenomena are not far to seek. 'Too easy a test excludes from operation some of the factors which make for an extension of the curve at the upper end of the scale, whereas, too hard a test excludes from operation factors which make for the extension of the curve at the lower end of the scale.' Now the questions in our test are extremely easy for the graduates as anybody can see it, while they are a bit difficult for the lower form students. The two factors have their reflexion on their distributions. But, for the group of students belonging to the higher classes the questions involve factors that make for the chances of distribution and therefore, the extension of the curve even, on either side of the score-ends.

The second assumption of Monroe about the constancy of the variability of the distributions in grade groups has its origin in the findings of different test-makers in America, who have

established that the measures of variability such as σ (sigma), of a given ability or a group of abilities in successive grades tend to remain constant, although in many cases these seem to increase slightly as we advance from the lower to the higher grade. This position exactly agrees with the nature of σ 's in Tables 1, 2 and 3. So we see that the second expectation also comes true.

Besides the satisfaction of the two important expectations dealt with above, which are more or less scientific, other expectations from the layman's point of view may be found fulfilled. Tables 1 and 2 show that each measure of students' abilities, namely, Q_1 , Q_3 , median and mean, increases systematically from the lowest to the highest class, a fact which one naturally expects. Then again, a glance at Table 4 below, which is a consolidated list of percentage of correct responses secured from the students of Patna and Calcutta, will show that in a large majority of cases the responses decrease in magnitude as we advance from the higher to the lower classes. This also is what one expects to be. Thus we conclude that the validity of the test is established.

Of the three methods generally in use for determining the reliability of a test the 'repetition' method is the simplest and the best. This consists in giving the test and then repeating it to the same subjects and lastly in calculating the correlation between the first and the second sets of scores. The correlation thus derived is usually known as the 'reliability coefficient'.

In the present case, our test was applied to two classes at random in two schools at Patna sometime after its first application and the coefficients of correlation calculated by the 'product-moment' formula were found to be .82 and .94. The process might have been extended to other classes also, but as it would take much time and labour I had to remain satisfied with these coefficients only, which are without doubt sufficiently high.

The combined distributions for the two top classes both of Patna and Calcutta being normal, we can calculate the 'standard errors' of the respective means to show the extent of their reliability, thus,

For Patna students.

$$\begin{aligned}\text{The standard error of the mean} &= \frac{\sigma \text{ dist}}{\sqrt{N}} = \frac{5.78}{\sqrt{735}} \\ &= \frac{5.78}{27.1} = .21.\end{aligned}$$

The statistical interpretation of the above is that the chance is almost 99% of the true mean lying between $15.07 \pm 3 \times .21$, i.e. between 15.7 and 14.44.

For Calcutta students.

$$\text{The standard error of the mean} = \frac{5.5}{\sqrt{461}} = \frac{5.5}{21.5} = .25.$$

The chance is almost 99% of the true mean lying between $14.86 \pm 3 \times .25$, i.e. between 15.61 and 14.11.

Taking the two results together we may safely say that the 'true' average ability of all the students of the top classes in Bengal and Bihar lies between 15.7 and 14.11, or safer still, between 14 and 16. Thus, the deviations of the 'obtained' means from the 'true' being insignificant, their reliability is fairly assured. As there is no sense in applying this criterion to the two lower forms where the distributions are 'asymmetric', we may depend, in their case, only on the reliability coefficients found from the repetition method as stated above.

In a standardized objective test the qualifying word 'objective' is significant in that a test cannot be good unless the results secured therefrom are free from the subjectivity, i.e. 'the personal equation' of the examiners who mark the answers. In our test the objectivity is amply ensured. Each sum contains the minimum possible work-units, and one point score only is awarded to an answer if it is right and nothing if it is wrong. Thus the assessment of credit being based entirely on the principle of right-or-wrong, there can be no varying opinions, personal bias or the like, regarding the scoring of answers.

As regards the other criterion for the satisfaction of a test, namely, ease of administration and scoring, suffice it to say that in half an hour's time it can be administered to any number of students if only arrangements for strict invigilation are ensured. The ease of scoring will be secured if our 'answer-scale' is used in marking the answers. This is a printed strip of paper always attached to the test pamphlet containing the directions for use and interpretation of results. This strip of paper contains the numbers of the questions and their answers printed in such a way that it can be easily placed on the left hand side of each test paper so that the corresponding numbers of the questions in the two may exactly fit one with the other. Now the numbers of the questions with correct answers may be ticked off and counted, and their totals put down below. This facilitates the scoring to a degree not possible to attain in any examination with which we are acquainted.

Analysis of Students' Responses.

Apart from the measurement of the student's abilities in reasoning arithmetic for which the test was planned there is another important use, namely, the analysis of their responses from educational and psychological points of view. On actual counting it was found that out of 72,120 questions that were

presented to 2,404 students, 1,520 of Patna and 884 of Calcutta, 29,371 were correct and the rest either wrong or untouched. The correct responses were now taken up and counted for each class, question by question, and then their percentages were calculated class by class as well as *en masse*, as shown in Table 4. The column of the total percentages led to the ranking of the questions in order of their difficulty values.

A glance at the table will convince the reader that in a large majority of cases the percentage of correct responses tend to decrease from the higher to the lower classes. But on more careful scrutiny we find that in some cases, especially in the two lower forms their tendency seems reversed. In their attempt to answer some questions students of the lowest class appear to be positively ahead of those of the next higher class. What is it due to? The causes for this anomaly seem to me to be the following:—

In Bihar the students in Class VIII have just finished almost the whole of arithmetic in their Middle Classes, VII and VI, where the subject is taught four or five periods per week, whereas one or two periods a week are allotted to it in Classes VIII and IX. So they begin to forget in these latter classes most of what they have learnt in the middle stage and also lose much of interest in Arithmetic due to the introduction of two new subjects, Algebra and Deductive Geometry, to which more time and attention are given. Thus we can't blame the students if, in Class IX, they fare badly in their attempt to tackle some topics of arithmetic or do not make as much progress as they are expected to make. The same position, I presume, holds good in Bengal too.

Almost equal responses made by all classes at Patna to question 2 appear at first sight to indicate that this question is not suitable for the test. But the corresponding figures for the Calcutta boys do not confirm this view. In both the places the responses in the lowest class are about 50%; but while in Calcutta they rise up to 80% in the highest class, in Patna they remain stationary. On closer analysis of answers to this question we find that most of the wrong answers in Patna were due to the presence of the English words 'per pair' which the students must have thought as meaning 'one'. Now when we consider that the test was given in Bengali to boys in Calcutta and in English to all classes at Patna except in the lowest in which the sums were translated in Hindustani and Bengali, it will be clear that the percentage would have increased as in Calcutta had these been given in vernaculars in all the classes.

The percentage of correct responses as shown in the table can be easily utilized in transforming the test into what is called a 'Difficulty Scale'. The method is simple. Take the question for which the percentage of right responses is the largest as the easiest one, and put it first. Take the question for which

TABLE 4.

Question Nos.	PATNA SCHOOLS.						CALCUTTA SCHOOLS.					
	Percentage of correct responses, class by class				Percentage, on Total	Ranking of questions on difficulty values	Percentage of correct responses, class by class				Percentage on Total	Ranking of questions on difficulty values
	XI	X	IX	VIII			X	IX	VIII	VII		
1	80.5	75	66	59	69.6	26	80.6	74.8	46	65	67.4	29
2	50	48	49	50	49.4	20	80.2	68.1	68	52	67.3	28
3	47	24	17	9	23.3	6	21.4	18	5	5	12	5
4	82.3	77.8	80	71	77.4	29	79	62	60.5	54	64	26
5	39	36	34	30	34.8	14	54.2	42.6	30	30.5	40	15
6	70	60.3	62.5	59.4	62	23	68	62	56.5	49	59	22
7	90	87	82	78	83.8	30	82.3	76	63.5	63.2	71.7	30
8	53	41	37	32	40.3	16	49	44.8	35.5	26	39	14
9	50	35	22.6	10	28.5	11	6	4.4	4.5	6	5.3	1
10	84	66.7	66.9	65	70	27	77	69.5	56	48.4	63	25
11	63.5	48	37	36.6	45.6	19	58	54	30	29	43.4	17
12	83	62	53.6	30	55.6	22	60	54.7	31	28	44	18
13	52	32	18	10.5	27.3	9	8	12	1.5	5	6.9	3
14	82	68.5	45	58	62.7	25	77.3	56	51	44	57.6	21
15	76	65	53	56.5	62.3	24	77.3	72.7	46	45.7	61	24
16	25.5	9.8	7.7	10	12.7	3	42	25	13	20.6	15.8	6
17	35	17.5	12	5	16.5	5	39	15.7	6.5	8	18	7
18	34	23.9	22.7	22.7	25.4	8	66	48.4	35.5	45.7	50	19
19	60	35.5	17	10	29	12	44	32	8.5	5.4	23.2	10
20	53.5	38	30	24	35.5	15	50	51	29	36	42	16
21	54	48	42	37	45	18	62.6	56.5	43.5	33	50.4	20
22	57.7	43.3	15	20	33	13	53.3	54.7	8.5	19	35	13
23	61.4	44	40.7	24.4	41.6	17	44	28	11	12.5	24.5	11
24	40	28	22.3	11.8	24.7	7	51	28	22	14	29.2	12
25	27	13.3	12.7	4.8	13.8	4	16	9	4.5	9.4	10	4
26	43	34.7	17.5	16.6	27.4	10	33.2	23.3	11	14.3	21	8
27	18	12.5	8	4.8	10.5	2	7.6	5.4	5.5	6.3	6.2	2
28	11.6	6.6	4	9	7.8	1	25	18	13.5	29	21.6	9
29	64	54.7	53.3	50	55.1	21	67.2	63.7	56.5	54.7	60.7	23
30	74	77	70	66.4	72	28	77.3	70	60.5	56	66.2	27

the percentage is less than the preceding one but more than any of the rest and put it second in ascending order of difficulty. Proceed in this way till the remaining question is reached, for which the percentage is the least and consequently the hardest of the questions.

The analysis of responses is of great help to the teacher of arithmetic. By such process he can judge by himself as to which questions are easy and which are difficult for his pupils of different classes and he can take steps accordingly. The Headmaster of a school may see how his classes are making progress by comparing the results of analysis of one year with those of the previous years.

A comparative study of the arithmetical abilities of the students of Secondary Schools in Bihar and Bengal.

When the arithmetical abilities as measured by our test of all the students who were our subjects were distributed in the same frequency intervals, and then represented graphically, as in Fig. 4, one for Patna and the other for Calcutta students, two bimodal curves of like nature resulted, each with one mode between 8 to 10 and the other between 14 to 18 point scores.

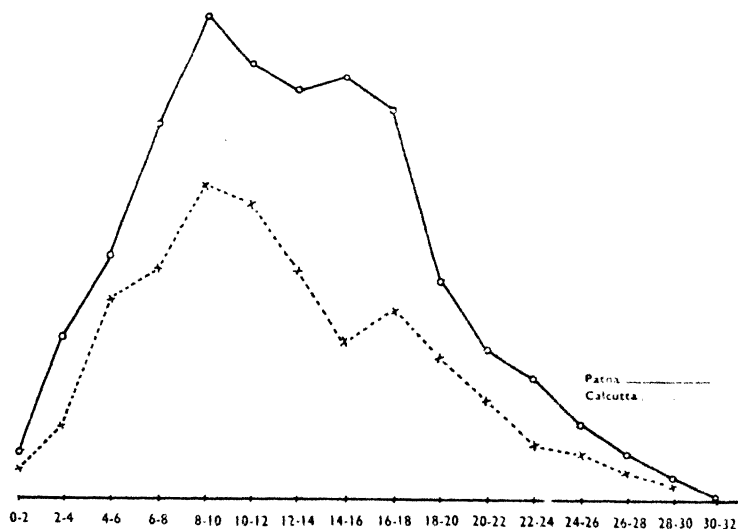


FIG. 4.

If we study this figure along with Table 3 we can easily conclude that in each case there are two distinct groups of abilities, one tending to be normal and the other non-normal.

This fact, which has been already dealt with, will be more clear from Figs. 1, 2 and 3.

Now let us go back to Tables 1 and 2. We find that each of the measures, Q_1 , Q_3 , median and mean, in both cases increases from the lower to the higher classes at rates that are almost equal to one another. One thing that comes out prominent on closer scrutiny of this rate of increase is the fact that it is extremely slight,—almost imperceptible,—from the lowest to the next higher class, but quite uniform from this latter class upward, and this will appear more clear from Table 5.

TABLE 5.

	Calcutta Classes	Q_1	Median	Q_3	Average
Difference between ..	X & IX	2.7	3.1	5	2.6
Do. ..	IX & VIII	3	3.9	5.3	3.9
Do. ..	VIII & VII	.8	.5	.2	.1
	Patna Classes				
Do. ..	XI & X	3	2.9	3.9	3.2
Do. ..	X & IX	2.2	3.4	2.3	2.4
Do. ..	IX & VIII	1	.6	1.5	1.2

The difference of measures between Classes IX and VIII in Patna is almost negligible while these are prominent and uniform between X and IX, and also between XI and X Classes. Similar is the case in Calcutta. But if we combine the distributions of Classes VIII and IX of Patna and VII and VIII of Calcutta, as in Table 6, we find that the rate of increase is now uniform to a great measure.

From what we have discussed above we may conclude without any fear of contradiction, that about a year's progress in arithmetic, if not in any other subject, is clearly lost to the boys during the first two years of their career in the four top classes of High Schools in both provinces. I have already given some hint about the causes that seem to lead to this situation and now I leave it to the teachers and educationists to ponder over it and devise some remedy if they can.

TABLE 6.

	Calcutta Classes	Q_1	Median	Q_3	Average
Difference between ..	X & IX	2.7	3.1	5	2.6
Do. ..	IX & (VIII & VII) combined	3.4	4.1	5.4	4
	Patna Classes				
Do. ..	XI & X	3	2.9	3.9	3.2
Do. ..	X & (IX & VIII) combined	2.7	3.7	3.1	3.1

Let us refer once again to Table 4 to compare the difficulties that the two groups of students found in answering the questions. Taking the percentage of correct responses of all the classes for all the 30 questions as given in the two total's columns and applying the 'product-moment' formula used for ungrouped series, namely,

$$r = \frac{\Sigma x^2 + \Sigma y^2 - \Sigma d^2}{2\sqrt{\Sigma x^2 \cdot \Sigma y^2}},$$

we have calculated the correlation of the difficulties as felt by the students of Patna and Calcutta as $r = .93 \pm .016$. This close relationship regarding the difficulties of the questions also appears to the eye if the two columns in which these are ranked, are carefully compared. Thus, the difficulty values of the sums tend to be the same for the two groups of students, although this is not so in regard to a few of them. Question 7, for instance, is the easiest for both the groups, but question 28 is the hardest for the Patna students and only 9th in the ascending order of difficulty for the Calcutta students. This fact seems to require more than a passing reference. From my personal experience in the field of the group test of intelligence I know that a high degree of intelligence is necessary for answering the question 28 correctly, and so I was not much surprised when I found that for the Patna students it was the hardest. But my surprise knew no bound when I found that this question was only 9th in order of difficulty for the Calcutta students, although they

lagged behind the Patna students in their responses to as many as 19 out of 30 questions.

The explanation of this phenomenon seems to me to be this: The innate, general ability ('*g*' factor?) of the students of Bengal, on the average, is quite high; but at present they are prevented from bringing their ability into full play in their school subjects on account of various extraneous factors, e.g., undue attraction to non-educational subjects, acute unemployment after Matriculation causing a general lack of interest in school study, unfavourable school conditions, etc.

There are three sums in the test namely, 3, 9 and 13, that involve measurement of area. The responses to these secured from the two groups are widely different,—the Calcutta students faring miserably in each, and one of these, namely, sum 9, has been found to be the hardest for them. This means that sums on areal and linear measurement are not properly taught in the High Schools of Calcutta.

As regards the sum 18 involving tackling of five different coins the percentage of correct responses of Calcutta boys is double that of Patna. Does it mean to say that the Calcutta guardians are more money-minded than their Patna confrères?

In conclusion let me extend my heartiest thanks to those Headmasters and teachers who were so kind to co-operate with me in conducting our test at their schools and also to my numerous students of the Patna Training College who volunteered their services in counting and computation of figures at various stages of my work. My thanks are especially due to the Headmasters of the three High Schools in Calcutta for their hospitality so freely extended to me and their esteemed help in carrying out my work there.

Patna Training College, }
Patna.

REVIEWS OF BOOKS.

THE TRAVANCORE TRIBES AND CASTES, VOL. II. By L. A. KRISHNA IYER. Published by the Government Press, Trivandrum, 1939.

The words 'and Castes' in the title of this work are misleading since the author states in his preface that the volumes are the result of twelve months' special duty from September, 1937, 'to complete the ethnographic survey of the Proto-Australoid element in the . . . State'. Records of the social and physical anthropology are given for fifteen tribes (eight in this volume), two more than were dealt with by the author for the 1931 Census. The additions are the begging Nayadis, the Parayans and Pulayans (with the previously included Thantapulayans) who are descended from agrestic slaves and are not Hill Tribes. These three peoples are treated in over half of the 260 pages on social anthropology in Volume II. Little if anything new is added to their ethnology as previously recorded by Aiyappan and Ananthakrishna Ayyar except an interesting account of slavery in Kerala and of recent progress in social uplift, also lists of kinship terms and clan names for the sub-groups of Parayans and Pulayans. The chapter on the Muthuvans gives a good non-technical account of the tribe and its life, but no reference is made to the author's earlier paper on these people. There is a useful map at the beginning of each chapter to show the geographical distribution of the tribe taken up and a frontispiece map of Travancore which gives the distribution of all the tribes treated in both volumes. There are over one hundred photographs in this volume, some of which are very good and will be particularly appreciated by non-Malayalis.

Each of the eight tribes is treated in a separate chapter under several heads such as: origin, structure, marriage, pregnancy, birth, puberty and funeral customs, religion and appearance. These headings are well indexed at the end. Since the author is a Forest Officer readers will regret that very little attention has been paid to ethnobotany. Four of the tribes (Nayadis, Paliyans, Uralis and Vishavans) numbered less than one thousand in the State in 1931. The treatment of these can be characterized in the words of the review of Volume I given in '*Nature*', it 'repeats and amplifies the admirable synopsis of the Census Report for 1931, based on the author's notes'.

The last chapter of 61 pages on physical anthropology contains new material of interest to the professional anthropologist. After a general discussion of the effects of environment, anthropometric work in India and of skin and hair characters, measure-

ments for the following definite characters are given for sixteen tribes (Pulayan and Thantapulayan account for the extra one): Circumference of chest, stature (with percentages of pygmy, short, medium and tall), cephalic and nasal indices (with percentages of three types in each). The samples are of a good size, especially for India, only six are less than 50 and four are over 100, including Kanikkar sample of 240. Beyond the mean for each character and the standard deviation no other data are given. These characters are discussed with excerpts from various anthropologists together with the racial position of the tribes. The author identifies them with the Nishadas of the Vedas and follows other workers in attributing to them a Negrito-*proto-Australoid* (or *pre-Dravidian*) descent. He holds with other anthropologists that the more isolated the tribe the higher the nasal index, the more it has crossed with surrounding people the lower the index. At the end there are sixteen lithograph plates with two to four distribution graphs on each for stature, cephalic and nasal indices for each tribe. There is an appendix containing two Pulaya songs in Malayalam, a good general index and an index of exogamous clan names. In a 54 page introduction Baron von Eickstedt contributes a useful outline of the history of anthropological research in India and attempts to force the adoption of a clumsy 'ternary nomenclature of the Indian race types' in which most of the names are quartern, with threats against 'priority' iconoclasts. Since no two taxonomists agree as to the exact nature of species, let alone sub-species, race and 'type', any attempt to erect a rigid technical nomenclature to include them all in modern man can result in nothing more than an academic curiosity. He omits to say where the type specimens of his *Homo sapiens indomelanicus kolidus* and other 'race types' are filed. In his conclusions Mr. Iyer discards Eickstedt's popular designation of 'Weddids' for his tribes, together with 'the time-honoured appellation' of *Pre-Dravidian* and gives his vote for '*Proto-Australoid*' with Sewell and Hutton.

Because the subject-matter dealt with is so important to anthropology and of such interest to cultured persons everywhere it is regrettable to discover signs of inaccuracy, haste and slipshod writing in this work which cannot but cast doubt on the validity of the other data which the reader cannot check. *Examples of Inaccuracy*: (a) in Tables IX and X data for Malapantaram, Malavetan, Muthuvan and Kanikkar differ from the same data given for the same tribes in Table VII and previous tables, e.g. Malavetan Nasal Index in Table VII = 89.77 in Table X = 92.7; (b) under *Muthuvans* we read 'When a girl attains puberty at the age of fifteen, she is lodged in a separate shed, etc.' What happens if she is younger is not stated. Under '*Vishavans*' we learn 'Girls generally attain puberty at about the age of twelve'; (c) Tallness in *Uralis* is laid to their elevated

environment and their robust build 'is due to the rarified air of 3,000 feet'. On the other hand, the fact that the tallest tribe is the Southern Pulayas of the lowlands is credited to 'the dry healthy climate and high nutritive content of their food' (no account is given of this valuable diet). *Examples of hasty work and slipshod writing:* (a) The author's conclusion after thirteen pages about the Paliyans: 'The Paliyans are good singers like the Mannans. They are lazy and try to carry on with the minimum of labour.' (b) His conclusions for twenty-four pages on the Ullatans is a quotation from Visscher who wrote in 1862 that they wear no clothing 'and regard the tiger as their uncle' and recorded customs with regard to this 'relative' to which Mr. Iyer adds, 'They no longer observe these customs'. (c) From page 182, we learn that among the Pulayas 'to be crossed by a cat' is a bad omen.

The work is evidently faulty but because of the intrinsically valuable subject both this and the previous volume will make very interesting reading for the undergraduate and lay reader. A glossary of the Malayalam terms would have been helpful.

Throughout Volume II the bibliographical references are given in footnotes and on the very last page there is an alphabetical list of bibliography. The latter is most incomplete, in many cases authors' initials and dates of publication are omitted; Ernest Crawley is placed under *E*, Herbert Spencer under *H* and Robert Lowie under *R*. All this must embarrass the gentlemen who are thanked for help in editing in the author's preface.

Those who have already purchased Volumes I and II may be interested to learn that Volume III is merely a repetition of what has been given with a transcription of the article on 'The Primitive Tribes of Travancore' by Iyer and Pillai from Volume I of the 1931 Census of India.

E. W. E. MACFARLANE.

THE TRAVANCORE TRIBES AND CASTES. THE ABORIGINES OF TRAVANCORE, Vol. III. By L. A. KRISHNA IYER. Published by the Government Press, Trivandrum, 1941.

The author in his preface says that this last volume of his work contains his 'conclusions on the study of the tribes to which blood grouping studies have yielded additional evidence. It attempts an interpretative glimpse of the inner life of the tribes ... It gives an exposition of primitive culture in all its aspects'.

After a short introduction by Professor Marett the first chapter is a transcription of pages 262-279 in the last chapter of Volume II on physical anthropology. Even the same mistake is repeated on page 11 of attributing to Hodson an excerpt from

Guha's introduction to the 1931 Census Report. Then follows Chapter II 'Traditions of Origin' which is an exact transcription from pages 231-233 of the article by Iyer and Pillai in 1931 Census of India, Vol. I, although this is not referred to by footnote nor in the list of bibliography. Chapter III is a transcription of the second half of the last chapter of Volume II, including the conclusions in full; two pages about blood group data are interpolated. The tables of physical measurements, with the same inaccuracies, are copied from Volume II but they are no longer numbered consecutively, those in Chapter III starting off as Tables I, II, etc. again. On page 34 Iyer says: 'I give below the results of my study based on extensive measurements of the primitive tribes of Travancore.' Two tables follow (Chap. III, Tables I and II) and the first contains Thurston's data without his name being mentioned; in Volume II, Table VI, the same data are given as 'recorded by Thurston'. At the back of the volume the same lithograph charts from Volume II are reproduced, together with the same error of giving the scale for the distribution charts of cephalic and nasal indices as '1 inch = 10 cms.'

Chapter IV on Megalithic Monuments is also transcribed from the 1931 Census Report with a few sentences added. Chapter V on Domestic Life is taken partly from the Census Report and partly from the author's paper 'The Primitive Culture of Travancore' (*Proc. Ind. Acad. Sci.*, 4: 435-453, 1936), which is not referred to in the bibliography either. These two older papers by the author have also been resurrected to make the next six chapters, with the addition of an occasional sentence or paragraph here and there.

Nearly all the data on social anthropology in Volume III were thus already collected in 1931, nearly ten years ago, and now they are presented again as 'conclusions'.

The blood grouping data of Dr. Karunakaran for 211 Kanikkars in Chapter I are interesting in that they differ from those for other West Coast Tribes in showing more of Group B than of Group A. The author, however, insists that the figures 'very nearly approximate' those for Australians (who are known to be almost devoid of Group B) and attributes the 29.8% Group B in the Kanikkars to 'miscegenation with the high caste Hindu'. The three tables presenting blood group data have no numbers. In the second the data for 'Pre-Dravidians' taken in Cochin State by Macfarlane are here attributed without evidence to the Kadar Hill Tribe. The papers from which other blood group data are taken for comparison are not given in the bibliography.

The following definition of *Hinduism* on the chapter on Religion is apparently new to the author's writings and one wonders how it would have been received from a non-Hindu—'animism more or less transformed by philosophy, or to condense the definition, as magic tempered by metaphysics'.

There are over sixty photographs, some very good, most of which have already appeared in the Census Report and in the first two volumes. There is an index, an alphabetical list of names of endogamous clans and an incompletely documented bibliography.

For those who have not already purchased the first two volumes of this work the third volume provides a lot of interesting matter about some fascinating tribes in a handy form with good illustrations.

E. W. E. MACFARLANE.

CLASSIFICATION OF FISHES, BOTH RECENT AND FOSSIL.¹

In 1924, while reviewing some American work on recent and fossil fishes, it was pointed out by the late Dr. N. Annandale and the present writer² that as regards bibliographical monographs ichthyologists are perhaps in a much better position than the students of any other group of animals. The great value of the monographs then reviewed has been fully realized during the last 17 years and at the present day no serious student of fishes can be without Dean's 'A Bibliography of Fishes', of which another volume is long overdue, and Jordan's 'The Genera of Fishes' and 'A Classification of Fishes'. From time to time, C. Tate Regan has been publishing an elaborate classification of all the recent fishes based on his own extensive osteological researches, and in 1929 he codified these in his article on 'Fishes' (pp. 305-328) in the 14th edition of *Encyclopaedia Britannica*. As no reprints of this learned article were published, it is unfortunately not easily accessible to many ichthyologists and has, in consequence, been little used. Quite recently, the Russian savant, Professor Leo S. Berg³, has brought out a work of unusual interest on the classification of fishes, in which he not only gives his views but includes concise and critical summaries of the earlier systems of classification and in foot-notes refers to the relevant recent literature on the subject. In the text brief notices are included upon the geological and geographical distribution of the families and the names of extinct groups of fishes are marked with a dagger. The structural peculiarities characteristic of the various groups are well illustrated.

¹ Berg, L. S.—Classification of Fishes, both Recent and Fossil. *Travaux Inst. Zool. Acad. Sci. URSS*, V, pt. 2, pp. 517. (Russian text up to page 345), 190 text-figs. (1940).

² Annandale, N. and Hora, S. L.—Fish: Recent and Fossil. *Journ. Proc. Asiat. Soc. Bengal (N.S.)*, XIX, pp. 101-103, 1923 (1924).

³ Professor L. S. Berg was awarded the Society's Joy Gobind Law Memorial Medal in 1936 for conspicuously important contribution to the knowledge of Zoology in Asia.

Berg is of the opinion that there is no reason to apply the rule of priority to taxonomic units higher than genera, and, therefore, for families he has adopted names widely known in literature. In this connection, he makes the following observations, with which the reviewer entirely agrees:

'Some authors believe, for some reason or other, that families must bear names after the first described genus. Such an obligatory rule does not exist, and the use of that principle can only lead to confusion. As concerns the genera, we adopt, generally speaking, the principle of priority, but within reasonable limits. I think it is inadvisable to reject, in deference to a "law" of priority, the old names which are widely used in the anatomical and biological literature and to replace them by names extracted from worthless and justly forgotten writings of a Rafinesque or Swainson. It seems to me that the long practice, of more than half a century, in the application of the "law" of priority has shown the complete worthlessness of this principle. Instead of putting the nomenclature in order it has thrown it into an inextricable confusion. Owing to the "law" of priority, it happens not infrequently that even a specialist cannot, without special references, make head or tail of the nomenclature.'

It is suggested that as regards genera 'enquiries into priority beyond the limit of XIX century should be prohibited (except, of course, for Linne); moreover, as regards the genera of Cuvier, which are widely used in the anatomical and biological literature, the rule must be established that "la recherche de priorité est interdite". On the whole, I agree with Heikertinger that the "law" of priority cannot be observed when we have to do with names having a wide currency'.

The above observations on the law of priority deserve very serious consideration, and it is time that a more workable nomenclatorial system should be adopted. At present, much time has to be spent in hunting for older names and justifying their use in current literature.

Seeing the mass of valuable information, properly documented, on the classification of recent and fossil fishes that has been brought together by Professor Berg in this work the great debt we owe to him is clear without further comment. Our gratitude is still greater, for besides the Russian text, there is a complete text, with the exception of text-figures, in English also. References to text-figures are, however, given in the English text and the explanations of the text-figures in English are also appended.

S. L. HORA.

INSTRUCTIONS TO AUTHORS FOR THE SUBMISSION OF PAPERS FOR PUBLICATION IN THE JOURNAL AND MEMOIRS OF THE SOCIETY.

PAPERS

1. All communications submitted to the Society for publication should be addressed to the General Secretary and not to any officer by name. They should be type-written on one side of the paper with sufficient margin on the sides, and *in all respects must be absolutely in their final form for printing.*

2. Papers must be accompanied by a brief abstract not exceeding 1,000 words, which shall indicate the subject of the paper and the nature of the advance in the existing knowledge on the subject.

3. Tables of contents (for long papers), references to the plates and literatures, etc., should be given in their proper places.

4. Quotations in Oriental languages should be in the original script, and wherever they are transliterated the System of Transliteration adopted by the Society must be followed (see instruction 15). The names of *genera* and *species* in the case of biological communications should be underlined to indicate that they are to be printed in italics.

ILLUSTRATIONS

5. All drawings and photographic prints should be as clear as possible. They should be in a form immediately suitable for reproduction, preferably of a size to permit reduction to about two-thirds the linear dimensions of the original, and should be capable of reproduction by photographic processes.

6. Drawings and diagrams to be reproduced as line blocks should be made with fixed Indian ink, preferably on fine white Bristol board, free from folds or creases; smooth clean lines or sharp dots, but no washes or colours should be employed for shading. The positions of the illustrations that are to appear in the text must be clearly indicated in the margin of the paper; and explanations of the figures should be typed at the end of the main paper with the indication: *Explanation of text-figures.*

7. The maximum space allowable for illustrations in the *Journal* and the *Memoirs* are as follows:—

Journal, text, $3\frac{1}{2}'' \times 6\frac{3}{4}''$; *Plates*, $4\frac{1}{2}'' \times 7''$.

Memoirs, text, $6\frac{1}{4}'' \times 9''$; *Plates*, $7\frac{1}{2}'' \times 9\frac{1}{2}''$.

These spaces include the usual figure numbering. Explanations of the plates to be printed on separate pages, facing the plates, must be typed on separate sheets.

PROOFS

8. A proof of each paper will be sent to the author, on the address given on the MS.

9. No alteration or addition necessitating any considerable change of type may be made in the proofs. Should such alterations or additions be necessary, these must be added as footnotes duly dated and initialled. The cost of corrections made in the proofs should not exceed 20% of the printers' charges for the setting of the paper; any excess will be charged to the authors.

10. The proof must, if possible, be returned within one week of the date of receipt to the Society duly corrected.

MISCELLANEOUS

11. Authors of papers published in the Society's *Journal* and *Memoirs* are entitled to receive *gratis* 30 copies of each paper, and as many more as they require on payment of the cost of printing, paper, and make up. Such requirements must be stated at the time of returning the proofs.

12. Papers by non-Members of the Society must be communicated through a Member, who shall satisfy himself that the paper is suitable for presentation to the Society, and is ready for the press.

13. No communications under consideration or accepted for the Society's publications may be published elsewhere without the express sanction of the Council.

14. To facilitate the compilation of indexes, each author is requested to return to the Society together with the proof, a brief index of the contents of the paper. These indexes will be edited and incorporated in the volume when completed.

15. The following systems of transliteration are henceforth to be followed (as far as practicable) in the publications of the Society, in quoting non-European words as such. In giving names of places, authors or books, which would occur in the course of the English text, a 'broad' transcription, following English values of the consonants and avoiding diacritical marks, is recommended.

SANSKRIT

अ = a आ = ā इ = i ई = ī उ = u ऊ = ū
 ऋ = ṛ ॠ = ṝ ऌ = ḷ ए = e (or ē) ऐ = ai (or ai)
 ओ = o (or ō) औ = au (or au) (Prakrit अर औ = ai, aū)
 ऽ (Anusvāra) = ṁ ः (Visarga) = ḥ × (Jihvāmūliya) = χ
 ॡ (Upadhmānīya) = φ

Sandhi Vowels may be indicated as â î û ê ô. *Avagraha* = '.
 Accents in Vedic—*Udatta* á â etc. *Svarita*—à.

क ख ग घ ङ = k kh g gh ṅ (or ṇ)
 च छ ज झ ञ = c ch j jh ñ (or ṇ)
 ट ठ ड ढ ण = ṭ ṭh ḍ ḍh ṇ
 त थ द ध न = t th d dh n
 प फ ब भ म = p ph b bh m
 य र ल व = y r l v (or w)
 श ष स ह = ś ṣ s h
 ङ ञ = ḷ ḷh

HINDI (and other North Indian Speeches)

As for Sanskrit, only nasalised Vowels are to be indicated by a *tilde* mark (˜) above the Vowel (e.g. अँ अाँ अं ऐँ = ā ã ū aĩ).

etc.), and ड ढ are to be denoted optionally by either $d \text{ dh}$ or by ṛ ṣh . Care should be taken in distinguishing ब and व (b and v)—the latter preferably may be written as w rather than v , specially in intervocal and final positions. The final silent $-a$ may be optionally omitted : but in quoting Early Hindi, etc. the final a should be retained. ळ ञ as in Rajasthani, Panjabi, etc. are to be indicated as in Vedic.

BENGALI

The system for Sanskrit, with the provision for nasal Vowels and for ড় ঢ (= ड ढ), as in Hindi. For ব (অন্তঃস্থ ব) , in all *tatsama* or pure Sanskrit words, y should be employed, in Prakritic and semi-*tatsama* words, j ; subscribed ব (ব-ফলা) should be indicated by y . The difference between বগীয় ব (= b) and $\text{অন্তঃস্থ ব (= v, w)}$ need not be indicated for Bengali— b may be written for both : only subscribed ব (ব-ফলা) is to be written as w (e.g. Skt. *Viśvāsa* = Bengali *Biśwās*). Final $-a$ may be omitted optionally, but it should be retained for Early Bengali.

ARABIC

In transcribing Arabic, according to the context either (i) the native Arab pronunciation (as current in the *Jaziratu-l-'Arab*) or (ii) the Perso-Indian pronunciation may be followed.

(i) Arabic in native Arab Pronunciation—

أ (alif hamza) = ' ; ب = b, ت = t, ث = th (or θ) ; ج = j (or ġ), ح = h, خ = kh (or χ, or x) ; د = d, ذ = dh (or δ) ; ر = r, ز = z ; س = s, ش = sh (or š) ; ص = s, ض = d ; ط = t (or t̤), ظ = z (or z̤) ; ع = ' , غ = gh (or γ) ; ف = f, ق = q ; ك = k ; ل = l ; م = m ; ن = n ; و = w, ū ; ه = h ; ي = y, ī.

— respectively = a, i, u (or ē, ö optionally in place of i, u), ٱ = a, i, u ; آ = ā ; إ = ī ; و = ū ; ع = ay (or ai) ; َو = aw (or au) ; tanwīn = ^{un, an, in} above line ; ى = á. (Note : عبد الحق = 'Abdu-l-Haqq, or 'Abd al-Haqq, not 'Abd-ul-Haqq.)

ذ = t (or h, or th).

(ii) Arabic in Perso-Indian Pronunciation, in the case of the following letters—

ث = ṡ, ذ = ḏ, ص ض = ṣ ḏ, ط ظ = ṭ ḏ.

PERSIAN

As for Arabic in Perso-Indian Pronunciation, with the following special Persian letters added :

چ = p, چ = ch (or c, or č), ژ = zh (or ž), گ = g.

چ may be indicated for Persian by v rather than w.

For Early Modern Persian, and Indian pronunciation of Persian, the *majhūl* sounds of و and و (= ē, ō) may be employed side by side with the *ma'rūf* sounds (= ī, ū).

و = au, ai. Nasalisation (*nūn-i-ghunna*) may be indicated by *tilde* mark (˜) on the top of the Vowel, as in the case of Hindi, etc.

Hā-i-mukhtaḡ can be represented optionally as ah or a.

The *Izāfat* is to be written as -i- (or -e- optionally).

URDU

As for Persian, only و = w, rather than v. See also the directions for Hindi. The special Urdu letters in the Perso-Arabic alphabet for Urdu are to be transcribed as in Hindi, e.g. ث = t, ذ = d, ژ = r (or ṛ).

TAMIL

In transcribing Old Tamil, the modern pronunciation should not be followed—an exact transliteration will be enough for the purpose. This is in case of the consonants, which for Old Tamil should be indicated as below :—

க = k (never g, even medially) ;

ங = ṅ (or ŋ)

ச = c (never ś, or j) ;

ஞ = ñ (or ɲ)

ட = ṭ (never ḍ, even medially) ;

ண = ṇ ;

த = t (never d, or th) ;

ந = n ;

ப = p (never b, or v) ;

ம = m ;

ய ர ல வ = y, r, l, v ; ன = ṇ ; ன = n' ; ற = r' (ன்ற = n'r',

not ndr ; ற = r'r', not tt) ; ழ = ṛ (or ḷ) ; ூ (*āyṭam*) = ḥ.

Long ē and Long ō are to be distinguished from the corresponding short vowels by the *macron* or length mark—the short e and short o being left unmarked.

TIBETAN

Vowels—	a	i	u	e	o
Consonants—k	kh	g	ṅ	(or ŋ)	
	c	ch	j	ñ	(or ɲ)
	t	th	d	n	
	p	ph	b	m	
	ts	tsh	dz	w	
	ž	z	'(or ʁ)		
	y	r	l	š	s h

Silent letters need not be attempted to be indicated in transcription, but if necessary, the modern pronunciation may be denoted by some consistent system of phonetic transcription within brackets after the transliterated Tibetan (or *vice versa*).

CHINESE

Usually the North Mandarin Pronunciation should be represented, in Wade's system, with tones denoted by numerals. As far as necessary or practicable, the original Chinese character and the reconstructed pronunciation of it in Ancient Chinese should be given within brackets.

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YEAR-BOOK
OF THE
ROYAL ASIATIC SOCIETY OF BENGAL
FOR 1939

VOLUME VI

1940

PROCEEDINGS OF THE ANNUAL MEETING, 1940.

FEBRUARY.

The Annual Meeting of the Royal Asiatic Society of Bengal was held on Monday, the 5th February, 1940, at 5 P.M.

PRESENT.

HIS EXCELLENCY SIR JOHN ARTHUR HERBERT, G.C.I.E., Governor of Bengal, Patron.

SIR DAVID EZRA, Kt., F.Z.S., M.B.O.U., President, in the Chair.

Members :

Agharkar, Dr. S. P.
Anderson, Mr. J.
Basu, Mr. J. N.
Biswas, Dr. K. P.
Bose, Dr. G.
Bose, Mr. S. M.
Bothra, Mr. S. K. Singh
Brahmachari, Dr. P. N.
Brahmachari, Sir U. N.
Brahmachary, Rai Bahadur S. C.
Brown, Mr. Percy
Cameron, Rev. A.
Chakravarti, Prof. C.
Chatterji, Mr. M. M.
Chatterjee, Mr. Patitpaban
Chatterjee, Dr. S. K.
Chaudhuri, Dr. Roma
Chopra, Bt.-Col. R. N.
Cloghorn, Miss M. L.
Dutt, Mr. M. N.
Fox, Dr. C. S.
Ghatak, Mr. J. C.
Ghose, Mr. S. K.
Ghosh, Dr. P. N.
Ghoshal, Dr. U. N.
Guha, Dr. B. S.
Haq, Prof. M. Mahfuz-ul
Hobbs, Major H.

Hosain, Dr. M. H.
Kramrisch, Dr. Stella
Law, Dr. S. C.
Lort-Williams, Hon'ble Mr. Justice John, Kt.
Mahtab, Maharajadhiraja Sir B. C.
Mahtab, Maharajkumar, A. C.
Majumdar, Mr. J. M.
Meyer, Miss S.
Mitter, Mr. S. C.
Mookerjee, Dr. S. P.
Mukherjee, Dr. J. N.
Mukherjee, Rai Bahadur Pannalal
Nag, Dr. K. .
Neogi, Dr. P.
Parker, Capt. E.
Pasricha, Major C. L.
Prashad, Dr. Bainsi
Rahman, Prof. S. K.
Rao, Mr. U. S.
Ray Chaudhuri, Prof. H. C.
Saha, Dr. M. N.
Sarkar, Sir Jadunath
Seal, Mr. S. C.
Sen, Dr. B. C.
Sen, Mr. D. N.
Siddiqi, Dr. M. Z.
Sircar, Mr. Ganapati
Sondhi, Mr. V. P.

Visitors :

Barua, Mr. Ambica
Barua, Mr. S.
Basu, Mr. M. M.
Bingham, Mr. G. E.
Biswas, Mrs. K. P.
Biswas, Dr. P. C.
Biswas, Mr. S.

Bose, Mr. A. M.
Brown, Mrs. Percy
Chakravarti, Mr. S. K.
Cameron, Mrs. M.
Chatterjee, Mr. A. P.
Chatterjee, Dr. B. K.
Chaudhuri, Mr. B.

Chaudhuri, Mr. H. D.	Mitra, Dr. A.
Cleghorn, Miss O.	Mitra, Mr. K. C.
Das Gupta, Miss Jyotsna	Mitra, Mr. N. K.
Datta, Mr. J. M.	Mitter, Mr. N. C.
Devi, Sreemati Mira	Mittra, Mr. R. K.
Edgley, Hon'ble Mr. Justice N. G. A.	Mukherjee, Rai Saheb D. N.
Edgley, Mrs.	Mukherjee, Mr. R.
Ekstrom, Mr. P.	Nag, Mrs. Santa
Ellis, Mr. N. A.	Pask, Dr. J. D.
Ezra, Lady	Patterson, Mr. A. M.
Fleming, Mr. Andrew	Patterson, Mrs.
Ghose, Miss Bani	Prashad, Mrs. R.
Guha, Mr. B. C.	Rao, Mr. H. S.
Guha, Mrs. Uma	Rao, Miss U. S.
Gupta, Mr. J. N.	Rao, Mrs. U. S.
Hafiz, Mr. K. A.	Roonwal, Mr. M. L.
Hosain, Mr. S. W.	Seal, Mrs. J. R.
Huda, Mr. S. S.	Sen, Miss Usharani
Hye, Mr. A. H. M. A.	Sethia, Mr. C. L.
Jacob, Mr. C. K.	Sinha, Mr. Ram Kamal
Khan, Hon'ble Mr. Tamizuddin	Townend, Mrs. T. J.
Khundkar, Hon'ble Mr. Justice	Wheeler, Mr. P.
N. A.	Wheeler, Mrs.
Khundkar, Mrs.	White, Mr. J. C.
Macfarlane, Dr. E. W. E.	White, Mrs. J. C.
Majumdar, Mr. D. C.	Wickins, Mr. J.
Majumdar, Mrs. D. C.	Wickins, Mrs.

and many others.

The President for 1939 declared the Annual Meeting open and said :—

‘LADIES AND GENTLEMEN,

Voting papers for the election of the new Council and Ordinary Fellows will be distributed to all the Ordinary Members Present. I request all Ordinary Members to deliver their votes in the collection boxes which will be sent round to them’.

After the distribution of the voting papers, the retiring President said,

‘LADIES AND GENTLEMEN,

Have all votes been delivered? If yes, I call upon Capt. E. Parker and Dr. Kalidas Nag to act as scrutineers. I now call upon the General Secretary to present the Annual Report for 1939’.

The Annual Report was then presented (vide page 30).

Then the retiring President announced that the General Lectures would be delivered as follows:—

(1) 16th February, 1940, at 6-30 P.M. Dr. Meghnad Saha : ‘Physics in Aid of Medicine’.

(2) First week in March. Bt.-Col. R. N. Chopra : ‘Use of Hemp Drugs in India’.

At 5-30 P.M. the retiring President vacated the Chair, and invited Sir Jadunath Sarkar to occupy it during his absence from the room.

The retiring President, the Treasurer and the General Secretary then left the meeting room to receive His Excellency Sir John Arthur Herbert, Governor of Bengal, Patron of the Society, at the entrance of the building.

On the arrival of the Patron the retiring President introduced the Council to him, and after a brief word of welcome invited him to occupy the chair.

After his installation in the chair, the Patron called on the retiring President to deliver his Annual Address.

The retiring President then addressed the meeting (vide page 9).

The retiring President then called upon the scrutineers to report and announced the results of Council election (vide page 16).

The retiring President then gave place to the President for 1940, who thanked the Society briefly.

The President for 1940 then invited the Patron to address the meeting.

His Excellency Sir John Arthur Herbert then addressed the meeting (vide page 14).

After the termination of the Patron's address, the President for 1940 proposed a vote of thanks to the Patron.

The vote of thanks having been adopted by acclamation, the President made the following announcements:—

'I have now great pleasure in announcing that, having heard the report of the scrutineers, I declare the following Ordinary Members:—

1. Dr. U. N. Ghoshal,
2. Dr. B. C. Law,
3. Dr. R. C. Majumdar,
4. Dr. H. S. Pruthi.

duly elected Ordinary Fellows of the Royal Asiatic Society of Bengal.

I have next to announce that the Elliott Prize for scientific research was instituted in 1892 by the late Sir Charles Elliott, the then Lieutenant-Governor of Bengal, to encourage original research amongst the younger generation in Bengal, Bihar and Orissa. The first award was made in 1893 and the prize was since then given by preferences for researches leading to discoveries likely to develop the industrial resources of Bengal, Bihar and Orissa. In rotation four different branches of enquiry form the subject of the prize, and last year the prize was for Geology and Biology (including Pathology and Physiology).

I have to announce that papers from four candidates have been received in competition for the prize for 1939, and the

Trustees have judged that the prize shall be awarded to Mr. P. K. Chatterjee.

The Prize for 1940 will be for Mathematics regarding which detailed information has been published in the *Calcutta, Bihar, and Orissa Gazettes*.

My next announcement concerns the Barclay Memorial Medal. This medal is awarded every alternate year for conspicuously important contributions to Medical or Biological Science with special reference to India.

This year the medal is awarded to Major General Robert McCarrison, Kt., C.I.E., M.D., D.Sc., F.R.C.P., LL.D., K.H.P., I.M.S. (ret'd.).

My next announcement concerns the Annandale Memorial Medal. This medal is awarded every three years for conspicuously important contributions to the study of Anthropology in Asia. This year the medal is awarded to Prof. Frank Weidenreich of Peiping.

The President invited the Patron to bestow the awards on the recipients or their representatives.

The President also announced a donation of Rs.500 to the Society by the retiring President, Sir David Ezra, Kt.

The President for 1940 made the following final announcement:—

‘In declaring the Annual Meeting dissolved, I now invite the members present to continue in Ordinary Monthly Meeting of the Society for the election of members and transaction of business, and visitors to inspect the exhibits shown at the other end of the hall.’

The President then conducted the Patron for examination of the exhibits (see page 17), and accompanied him to the entrance on his departure.

ANNUAL ADDRESS, 1939-40.

In my address to you last year I made certain observations regarding the work and activities of the Society based on my experience as its President during the past year. These observations dealing mainly with the material rather than the intellectual and cultural activities of the Society seem to have been very opportune, for during the past year your Council has had to devote a great deal of its attention to some of the pressing needs of the Society in this direction. Naturally the material well-being of the Society is intimately bound up with its cultural activities, and the latter also have, therefore, received a great deal of our attention. As all this work is of vital importance in connection with the future of the Society, I propose to devote my address this afternoon to a review of what has been achieved during the past twelve months. Details of our activities have already been presented in the Annual Report, but I am of the opinion that the value and magnitude of the accomplished task cannot be too strongly emphasized, and, although I will have to mention again what has been detailed in the Annual Report, I do so in the hope that my comments may help, even though in a small way, in consolidating the foundations of the work of resuscitation which have been so well and truly laid through the devoted work of a small band of our Council members who gave so much of their valuable time to finding out where the trouble lay and in propounding effective measures and policies to set the matters right. Here I would like to make a reference to the resignation last June of Mr. Johan van Manen who for the past sixteen years had held the office of the General Secretary. Having been in close contact with him for so many years I am sorry that he is not with us today. Let us hope that his health, which has not been good in recent years, will improve and that during his retirement he will be able to carry on his studies resulting in productive work.

At the beginning of the year under review it was prominently brought home to the Council, both through the Press and through individual member's comments, that the affairs of this old Society of ours were not progressing as smoothly as they should. Whereas the Council was prepared to concede that certain of the adverse criticisms might be justified, it was not prepared to accept the wholesale condemnation of the Society's administration without detailed investigation. It, therefore, appointed a Special Committee on the 27th February 'to enquire into the general administration and cultural activities of the Society, and to submit to the Council a detailed report with recommendations, if any, for effecting necessary improvements'. The

Committee was further requested 'to report on the alleged discrepancies between Rules and Regulations on the one hand and existing procedure and practices of the Society on the other'. This Committee, under the Chairmanship of Sir John Lort-Williams, and ably assisted by its energetic Secretary, Dr. Bains Prashad, and seven members of the Council after working for nearly six months, submitted a detailed report to the Council at the beginning of August. It reviewed every aspect of the Society's work and activities in great detail. To appreciate the magnitude of its task it is only necessary to see the volume of the material collected, sifted, weighed, and finally adjudicated upon. I attended most of its meetings in my capacity as President of the Society and having been in close touch with its activities throughout the period, I cannot but express my personal thanks and admiration for the careful, meticulous and painstaking manner in which its work was carried out. The members of the Committee took up their task with open minds, tackled it methodically, and passed their judgment on each matter with an impartiality and shrewdness which are deserving of the highest praise. I must also place on record my appreciation of the manner in which the members of the staff responded to the heavy calls made on them by this enquiry. The Council, after reviewing the report, was so convinced of the fair, complete, thorough and sound nature, not only of its criticisms but also of its recommendations, that in a special meeting on the 10th August, convened for the purpose, and at which no fewer than 14 members of the Council were present, it adopted the report *in toto* without a single note or remark of dissent. The findings and recommendations of the Committee are detailed under various heads in the Annual Report, and I will, therefore, only refer to a few of its salient features. It was found that laxity and oversight, delay and procrastination, lack of co-ordination and system were responsible for most of the complaints. Thanks to the untiring efforts that have been made by all concerned, these adverse factors have now disappeared. During the short space of five months that have elapsed since the Committee's report was adopted the outturn of work, both in quality and quantity, has been remarkable. The homogeneous and co-ordinated efforts of our staff have resulted in great improvements in all directions and our building and possessions are now in a condition of which we can justly be proud.

Turning to what has been done and the general policy for the future I propose to refer in general terms to the anticipated effects of the measures that have been adopted for putting matters right and to ensure that they remain in that state. Our publications, which are the main index of our activities, were considerably in arrears; many works had been started at considerable expense, but were not completed; official numbers of the *Journal* were seriously in arrears; the number

of papers, articles, etc. offered for publication had, mainly as a result of delay in their issue, sadly fallen off; while quite an appreciable amount of our resources were tied up in works in the *Bibliotheca Indica* Series, which had been sanctioned and started, but allowed to remain in abeyance. For publications in all departments which have been issued in 1939 I would invite your attention to the lists printed as Appendix II A of the Annual Report. The number of these, I venture to submit, is most gratifying, and reflects great credit on the editors, the Publication Committee and the Council, the office staff and finally the Baptist Mission Press, all of whom have worked hard to expedite their final issue. They have cost a great deal of money, but they are now available for scholars all over the world, and their sales indicate that we can expect a fairly speedy return of some part of the money that we have expended on them. This return to active publication has had other pleasing results. Material is now coming in for publication in an adequate quantity, and this shows that the Society's publications again appeal to scholars as being eminently well-adapted for recording the results of their labours. The number of new members joining the Society is again on the increase; there are 11 applicants for election at our Ordinary Monthly Meeting today. The procedure laid down for dealing with materials for publication has been revised, and authors can now rest assured that their works will not only be adequately and impartially judged, but will be dealt with expeditiously at all stages between their receipt and final publication.

In the library much has been and is being done to improve conditions so as to render our unique library of greater utility to all members and scholars. We now know what books are available, where they are, and in what condition they exist. All of them have been carefully examined, repaired and rebound and will soon be handsomely and satisfactorily housed in new steel shelves or almirahs which have been ordered for our library. The preparation of comprehensive catalogues has been taken up, and these, when completed, will give readier access to all our library possessions. A new feature in our publications, the Review Section, will, it is hoped, set a high standard for book reviews in this country, and in addition will enable the Society to receive valuable accessions free of cost. During the past year there has also been an increase in the number of institutions with which we exchange publications, this will enable us to enrich our library and increase its value to scholars.

The permanent staff of the office had for sometime past been working in watertight compartments and there was very little co-ordination of the work of various sections. This defect has now been removed, specific duties have been allotted to each appointment in such a manner as to render the working of the office much more elastic and interdependent, while definite scales of pay, which

have been introduced for all members of the staff, have removed much cause for discontent. The abolition of two appointments on the general side and the sanction of an additional one in the Indological department while contributing to the efficiency of the office organisation have resulted in a net saving on the staff. Correspondence and routine office work now receive prompt attention and the disposal of the various matters which come forward is consequently a matter of regular routine.

In regard to the cultural activities of the Society, general lectures, and establishing closer contacts with other institutions having similar aims and objects, I would refer you to the detailed account in the Annual Report.

For the initiation of all these reforms we are indebted to the Enquiry Committee referred to above, but the actual work of carrying out the recommendations has been performed by our General Secretary, Dr. B. S. Guha, and I would like to record here our grateful appreciation of the care, skill and tact with which he has done this difficult task.

The financial position of the Society, regarded from the purely limited aspect of receipts and expenditure, is satisfactory, but from the wider aspect of the many-sided programme of our future activities and of the urgent, but expensive improvements still to be carried out, it gives cause for anxiety, and will necessitate close attention on the part of our Council and Finance Committee during the next year. We have spent a great deal on all the reforms referred to above, and are committed to some further outlay on the provision of steel furniture, special bindings, catalogues of the library, structural repairs and additions to the building, and other not so important but equally pressing matters which are commented on in the Annual Report. With the increase of our publications, editorial remuneration, press, and binding bills have been correspondingly heavy, and some of our Funds such as the Oriental Fund No. 2, show a debit balance at the end of the year. The Government of India last year reduced their annual grant for Arabic and Persian MSS. from Rs.5,000 to Rs.2,500, but we have made strong representations for the restoration of the grant to its normal figure. Similar representations have been made to the Government of Bengal for the restoration of their grants to the Society which were reduced by 20% in 1932. Owing to the war conditions there has been an increase in all general items of expenditure, not too formidable at present, but nevertheless sufficiently marked to deserve close consideration. We have taken steps for the restoration of general lectures which were such a welcome feature of the Society's activities in the past, and are anxious to come into closer contact with other institutions by arranging, under the aegis of our Society, conferences and combined meetings, and providing intellectual and intersocial opportunities for cementing those contacts in a permanent manner. All this

means further outlay on our part. It will, therefore, be realised that whole-hearted support must continue to be given to the Society by all of us if it is to carry out its programme. Our Society holds a place in the cultural world that is second to none in this vast sub-continent—let us be worthy and jealous of that proud heritage, and work not only to maintain but to increase the prestige which is ours.

In handing over the office of President to my worthy successor, Sir John Lort-Williams, I do so in the sure knowledge that the direction of the affairs of our beloved Society could not be placed in better hands.

DAVID EZRA.

CALCUTTA,
5th February, 1940.

PATRON'S ADDRESS.

SPEECH BY HIS EXCELLENCY SIR JOHN ARTHUR HERBERT,
GOVERNOR OF BENGAL, AT THE ANNUAL MEETING OF THE
ROYAL ASIATIC SOCIETY OF BENGAL, ON THE 5TH FEBRUARY,
1940.

‘MR. PRESIDENT, LADIES AND GENTLEMEN,

I am very grateful to you for this opportunity of meeting the members of what, I think I am correct in saying, is the oldest and certainly one of the most illustrious learned Societies in India. I hope, however, you will not take it amiss when I tell you at the outset that I intend to confine myself this evening to a few remarks of a very general nature. You have already been addressed by others, who have a longer and closer association with the Society than I have, and I feel I cannot, as a newcomer, lay claim to their close knowledge of your work and activities.

I am, however, fortified by one thing. The Royal Asiatic Society of Bengal was one of my first links with my present office. For this I am indebted to a certain Mr. Walters of Dacca who was instrumental, in the early part of the last century, in bringing to notice what has come to be known as the Bhowāl plate. You must all be familiar by now with the history of this plate, how it lay for many years in the India Office, how it was recently discovered there, how you establish your ownership to it and, lastly, how I was commissioned to bring it out to Bengal three months ago—a commission which at first I was reluctant to accept. The plate has a value which no insurance can cover, for mere money can never replace something ennobled by age and history. I feared that the dangers of the voyage were such that I dare not risk submitting this valuable plate to the hazards of war. But in the end—I brought it in my own cabin, so as to be responsible for its safety.

The plate is now in your custody and though I cannot claim a ‘vested’ interest in the critical account of it which I understand is being published in the *Epigraphica Indica*, I shall look forward to seeing it with more than usual interest.

In these days of international strife and jealousy—factors which have once more plunged the world into a disastrous war—it is a relief not only for scholars, but also for those whose task it is to play their part in active politics, to turn to the domain of pure scholarship and survey its achievements and progress. A true scholar is not bound by considerations of national or racial advantage. He seeks to add to the sum total of human knowledge and cultural advance. Whilst some struggle to

evolve, by means of treaties, or may be, a League of Nations, some method of living together in peace and enjoying the material comforts which modern science has made possible, scholars have for many centuries lived in a state of what I cannot describe better than a 'state of international good-fellowship'. The scholar has time to meditate upon the past, to consider its significance as affecting the future, and to him knowledge of the past makes the present jealousies and hatreds of mankind seem futile.

When, on the other hand, attempts are made—as in Nazi Germany—to regiment and nationalize scholarship, the effect is to stifle and destroy its finest manifestations, removing this international flavour of mutual understanding.

Though your immediate activities are more closely concerned with the history and the culture of India, it is not, I think, inappropriate to recall the wider implications of your work and the importance which will be attached outside the Province and even outside India to the standard of scholarship and research for which you are responsible. It is for this reason that I welcome the greater extent to which scholars are availing themselves of your resources. A man who loves his country takes pride in its past, and you, rightly, encourage an increase in those who study the history of India,—this—great—country which is the pride of her children and which we are proud to serve, each attempting to fulfil our share of responsibility for her development. By delving into the past we may learn useful lessons for the future.

You have I know a busy evening before you and I myself am anxious to look round your premises later on. So I will not detain you longer except to say once more what a great pleasure it has been for me to come here this evening to meet you and wish you success now and for the years to come.'

OFFICERS AND MEMBERS OF COUNCIL.

ROYAL ASIATIC SOCIETY OF BENGAL, 1940.

*Elected and announced in the Annual Meeting,
5th February, 1940.*

President

The Hon'ble Mr. Justice John Lort-Williams, Kt., K.C.

Vice-Presidents

Bt.-Col. R. N. Chopra, C.I.E., M.A., Sc.D., M.D., F.R.C.P.,
F.N.I., F.R.A.S.B., I.M.S.

Sir Bijay Chand Mahtab, G.C.I.E., K.C.S.I., I.O.M.,
Maharajadhiraja Bahadur of Burdwan.

C. S. Fox, Esq., D.Sc., M.I.Min.E., F.G.S., F.N.I., F.R.A.S.B.

Syama-prasad Mookerjee, Esq., M.A., B.L., D.Litt., Barrister-at-
Law.

Secretaries and Treasurer

General Secretary:—B. S. Guha, Esq., M.A., Ph.D., F.N.I.,
F.R.A.S.B.

Treasurer:—Baini Prashad, Esq., D.Sc., F.Z.S.; F.R.S.E., F.N.I.,
F.R.A.S.B.

Philological Secretary:—S. K. Chatterji, Esq., M.A., D.Lit.,
F.R.A.S.B.

Joint Philological Secretary:—M. Mahfuz-ul Haq, Esq., M.A.

Natural History Secretaries :—
Biology:—Kalipada Biswas, Esq., M.A.,
D.Sc., F.R.S.E.
Physical Science:—Meghnad Saha, Esq.,
D.Sc., F.R.S., F.N.I., F.R.A.S.B.

Anthropological Secretary:—H. C. Chakladar, Esq., M.A.

Medical Secretary:—Major C. L. Pasricha, M.A., M.B., B.Ch.,
M.R.C.S., F.N.I., I.M.S.

Library Secretary:—J. N. Mukherjee, Esq., D.Sc., F.C.S., F.N.I.,
F.R.A.S.B.

Other Members of Council

Percy Brown, Esq., A.R.C.A., F.R.A.S.B.

S. C. Law, Esq., M.A., B.L., Ph.D., F.Z.S., M.B.O.U., F.N.I.

Kalidas Nag, Esq., M.A., D.Litt.

Sir S. Radhakrishnan, Kt., M.A., D.Litt., F.B.A.

M. Z. Siddiqi, Esq., M.A., Ph.D.

W. D. West, Esq., M.A., F.N.I.

EXHIBITION ANNUAL MEETING.

LIST OF EXHIBITS SHOWN AT THE ANNUAL MEETING OF THE ROYAL ASIATIC SOCIETY OF BENGAL, ON THE 5TH FEBRUARY, 1940.

1. ARCHÆOLOGICAL SURVEY OF INDIA.

The Bajaur casket inscriptions of the reign of Menander.

The inscriptions occur on a steatite casket which comes from Shinkot in Bajaur territory about twenty miles to the north-west of the confluence of the Panjkora and Swat rivers, beyond the borders of the North-West Frontier Province. The steatite casket is said to have encased a casket of silver, which in turn contained a gold reliquary and some ashes; but the silver and gold articles could not be traced.

The characters appearing on the casket are Kharoshthī and the language is the North-Western variety of Prākṛit as in the post-Asokan Kharoshthī documents. The inscriptions may be classified on grounds of palæography and style of engraving of letters under two distinct groups belonging on the one hand to the period of the Śaka Satraps of Taxila and Mathurā and on the other to the reign of Mahārāja MINADRA, i.e. the Greek king Menander, who ruled sometime in the second century B.C. The first set of inscriptions were engraved sometime in the first century B.C.

The earlier portion of the record refers to the establishment of the corporeal relic of the Buddha by a person named VIYAKAMITRA in the reign of Mahārāja MINADRA, *on the 14th day of the month of Karttika* of a certain year which is lost. The later portion of the record also refers to the establishment of the corporeal relic of the Buddha, and of the bowl, which had become desecrated and unfit for worship, by a person named VIJAYAMITRA, *on the 25th day of Vaisākha of the 5th regnal year*. One of the inscriptions of this later group mentions the name of the scribe VIŚPILA.

2. BANGIYA SAHITYA PARISHAD.

I. Paintings of old Bengal.

1. Old paintings of Bengal School from Vishnupur (Bankura).

II. Old documents of Bengal.

1. A deed of gift, 1123 B.S. (A.D. 1717) *re* the arrangement of the regular worship of Raja Pratapaditya's household deity Govinda-deva.

2. A deed of gift, 1160 B.S. (A.D. 1764), signed by Rani Bhavānī.

3. A petition written by poet Bharat Chandra Rai Gunakar to Maharaja Krishna Chandra Ray of Nadia with a note by Maharaja Krishna Chandra on it (vide *Sahitya Parisat Patrika*, Vol. 45, No. 3).

4. A deed *re* Sale of a human being (vide *Prabasi*, 1329 B.S.).

III. Autographs of some great men of Bengal.

1. Raja Rammohun Roy—Signature on a draft, dated 23rd August, 1833.
2. Michael Madhu Sudan Dutt—a letter.
3. Rev. Lalbehari De—a letter.
4. Raja Rajendralal Mitter—Miscellaneous notes.
5. Swami Vivekananda—a few lines.
6. Bankim Chandra Chatterji—a letter.
7. Keshab Chandra Sen—a letter.
8. Romesh Chunder Dutt—Manuscript copy of *Economic History of India*.

3. P. C. BISWAS.

Hereditary traits as transmitted in the pattern of the human palm.

Investigations on palmer patterns in recent years have been found to be of great value both for the study of racial classification and human genetics.

The areas on the palm of the hand where the patterns occur are Hypothenar, Thenar and Interdigitals.

The Hypothenar area comprises the proximal half of the ulnar portion of the palm. On this area pattern loop generally occurs (opened either ulnar side (L'') or to the radial side (L')).

The Thenar area comprises the proximal part of the radial side of the palm. On this area patterns appear not so frequently as on the Hypothenar area. On this area pattern loop (L) and whorl (W) can be seen.

There are four Interdigital areas on the palm :—

Interdigital area I is the space between the thumb and the first finger.

Interdigital area II is the space between first and the middle fingers.

Interdigital area III is the space between the middle and the ring fingers.

Interdigital area IV is the space between the ring and the little fingers.

The patterns on the above areas (Hypothenar, Thenar and Interdigitals, specially the fourth Interdigital) present strong evidence in favour of their hereditary transmission. The attached pedigrees show how they transmit.

Family No. 6.

It is a family of three generations. I found one parent had a loop on the right palm opened ulnarward (L'') while on the right of the other no pattern occurred. In the F₁ generation, out of five individuals, in the right palm of the four, a loop came into existence, on the same spot and of the same type as that of their parent. Two members of the family were married with wives having no loop. One of them got four children, each of whom was possessed with a loop of the same type, which appeared on the same spot on the right hand as that of their grandparent. The other got two children, one of them had no pattern at all, while on the right palm of the other a loop of the same type occurred and on the spot as his grandparent.

Family No. 9.

This is a family of three generations, in which I found on the left palm of one parent a pattern (L) occurred, while on the other it was wanting. They got nine children. Except two, on the left palm of seven children the pattern appeared. The eldest of them was married to a wife having no pattern on the left palm. But on the left palm of their children the pattern appeared.

Family No. 6.

This is a family of three generations, in which one parent had the left palm with a pattern loop on the fourth Interdigital area, whereas it was wanting on the left palm of the other. Five children were born to them. Except in one, on the left palm of the four children the same type of pattern and on the same spot occurred. Among these four sons, two sons are married. One was married to a wife of no pattern on the left palm. They had four children. In the left palm of the three, pattern appeared. The other one was married to a wife of no pattern on the left palm, but in the left palm of their children the pattern appeared.

4. PERCY BROWN.

A Chamba rumal.

* This is a good example of a *rumal* (handkerchief) from Chamba, a Punjab Hill State. These *rumals* are a characteristic of the folk art of this region, and are associated with the marriage ceremony. In effect they are not unlike the old English sampler, but of course very different in intention.

The present specimen is evidently an old one, but the art itself shows evidences of a very ancient origin. The ground of the textile is of cotton and the embroidery is generally produced by means of a double satin stitch thus enabling the pattern not infrequently to be the same on both sides of the fabric.

The subjects selected are nearly always popular scenes from the Krishna-cult; in this instance a round dance is depicted called the *Mandala-nritya* or *Rasamandala*, in which Krishna and Radha are the central figures. Around them is a ring of female dancers, and outside these another ring of musicians performing on various types of musical instruments.

5. CALCUTTA UNIVERSITY—ASUTOSH MUSEUM OF INDIAN ART.

Copper-plate inscription of Śrī Madanapāla [F. Plot, S. W. Sundarban, Bengal].

Written in Proto-Bengali characters on the side coated with silver, the inscription is dated 1118 Śaka era = 1196 A.D. As such it is the earliest dated Pre-Muhammedan record in Śaka era in Bengal. The suzerain referred to is a certain Pāladeva and his vassal Chief 'Mahāsāmantādhipati Mahārājādhirāja' with a peculiar name Śrī Madanapāladeva, the donor of the grant, belongs to a family which hailed from Ayodhyā.

The reverse contains the only important ancient engraving hitherto discovered in India. The group consists of a figure of Viṣṇu seated gracefully on a chariot with a devotee, probably Gaḍḍa, kneeling in front.

6. GEOLOGICAL SURVEY OF INDIA.

I. *Quartz crystals.*

The two specimens of rock crystal—P. 136 and P. 160—show the class of material that has often been used for optical work. The smaller crystal—P. 160—is rather flawed and is almost the minimum size now in demand for multiple telephone working and for radio-receivers in aeroplanes. The new uses above referred to are dependent on the piezo-electric properties of clear, unflawed, untwinned quartz plates which are cut in certain directions from suitable crystals. The demand is not large, but the material of suitable character is most uncommon and until recently most of the supplies were obtained from Brazil. During the past few months a discovery of quartz crystals has been reported from Orissa, but the occurrence and suitability of the material is still under investigation.

II. *Beryl ore.*

Although the clear coloured gemstones Emerald, Aquamarine and Beryl are rare forms of the substance beryllium aluminium silicate, the two specimens—J. 26 and K. 812—are also beryl crystals. This opaque material has been found suitable as ore for the extraction of beryllium oxide and its subsequent reduction to beryllium metal, which is of value in the preparation of certain copper alloys of great hardness and strength. The metal itself is used for the 'windows' of X-ray tubes and the electrodes of neon signs. Between 1932 and 1938 inclusive, India produced nearly 940 tons of beryl ore and was thus a considerable producer of this material. Most of the beryl ore is obtained from mica-bearing pegmatites in Ajmer-Merwara.

III. *Ilmenite.*

The exhibit of black beach sand—No. 3587—from the Travancore shore consists largely of grains of ilmenite—a titaniferous mineral which contains 31.6 per cent. of titania. When extracted, the titania is a valuable white pigment which has become of considerable value as a paint because it is non-poisonous and is a good covering material. India is at present the largest producer of titanium-ore in the form of ilmenite.

IV. *Mica.*

The exhibits of muscovite mica—A, B, C—show the size of some of the natural crystals of ruby mica obtained from the mica belt of Bihar. India is the greatest producer of the best quality mica. As in the case of the Quartz crystals, Beryl Ore and Ilmenite, practically the entire production of mica in India is exported.

7. M. MAHFUZ-UL HAQ.

Specimens of Calligraphy.

(1) A *Waslī* copied by Mir 'Alī al-Kātib, the court calligraphist of the Timurids of Persia (died about 957 A.H.).

(2) A *Waslī* copied by Mir 'Alī al-Husaynī, a celebrated calligraphist of the 16th century.

(3) A *Waslī* signed by Sultān 'Alī of Mashhad who is acknowledged to have brought the art of *Nasta'liq* calligraphy to its highest perfection (died about 921 A.H.).

(4) A *Waslī* transcribed by Mālik ad-Daylamī, the teacher of Mīr 'Imād, the greatest of calligraphists of Persia.

(5) A *Waslī* transcribed by Saiyyid 'Alī al-Ḥusaynī who came to India at the instance of the Emperor Shāhjahān to train Aurangzib in the art of calligraphy. The Emperor conferred on him the title of *Jawāhir Raqam*. The *Waslī* is dated Isfahān, 1058 A.H.

(6) A *Waslī* transcribed by Muḥammad Qāsim, a well-known Persian calligraphist of the 16th century.

(7) A *Waslī* copied by 'Abdur Rashid ad-Daylamī, the teacher of Prince Dārā Shikūh. The *Waslī* contains a well-known Quatrain of 'Umar Khayyām.

(8) A *Waslī* copied by 'Abdur Raḥīm, *Shirīn Qalam*, the celebrated calligraphist, on whom the Emperor Jahāngir conferred the title of *Ambarīn Qalam*. The *Waslī* is dated 1025 A.H.

(9) A *Waslī* copied by Darwish, the celebrated *Shikasta* calligraphist of Persia.

(10) A *Waslī* copied by Muḥammad Fā'iq, a calligraphist of the time of the Emperor Aurangzib.

(11) A *Waslī* copied by Mansā Rām, a well-known calligraphist of Lucknow.

(12) A specimen *Tughrā* calligraphy, dated 1057 *Hijra* (1646 A.D.).

(13) A *Waslī* copied by Parem Sukh, a calligraphist of Lucknow.

8. ROYAL BOTANIC GARDEN, CALCUTTA.

I. Hybridisation and vegetative propagation of rare plants of the Royal Botanic Garden, Calcutta.

Hybridisation and vegetative propagation in order to increase the stock of rare plants of the garden form an important feature of the horticultural activities of the Royal Botanic Garden, Calcutta. Some very fruitful results have been obtained from experiments recently performed at the Garden. A few of these instances are exhibited here.

(1) Some Ferns (*Adiantums*) of garden origin :

- (i) X *Adiantum fimbriatum* (Hort.) X (*Adiantum excisum* Kze. X *Adiantum tenerum* Sw.)—1937 Garden hybrid of the Royal Botanic Garden, Calcutta.
- (ii) *Adiantum tenerum* Sw.
- (iii) *Adiantum tenerum* Sw. var. *Farleyense*.
- (iv) A new sport of garden origin with erect fronds and much smaller leaflets developed from *Adiantum tenerum* in 1929.

The fern was originally introduced to this garden from Barbados years ago. This beautiful fern has been propagated in the garden on a wide scale since then, and a gallery composed of this fern is a lovely sight indeed.

(2) Some specimens of vegetative propagation from leaf :

- (i) *Gasteria acinacifolia* Haw. (A succulent). Single specimen of this South African plant was under cultivation in the garden for a very long time. No attempt has hitherto been made to propagate the plant. Successful propagation from leaf cutting was made last year. The specimen shows young leafbuds developing from the old leaf grown in silver sand.

- (ii) *Gasnera refulgens* (Hort. X?) is another delicate plant, on which successful experiment to propagate by means of root and leaf cutting has been made. The specimen shows a group of young buds growing from the leafbase and another set of buds developing from the root below.

(3) *Growing of Cactus from seeds :*

Cactus are generally propagated from cuttings of cladode, division of rooted offsets and also from the seeds as usual. Growing of these characteristic succulent xerophytes from seeds is by no means an easy task. It needs considerable manipulations and prolonged observations and patient work. Purchase of these rare plants from foreign countries is expensive and associated with much troubles. Therefore experiments to grow them from seeds had to be undertaken in the garden. A few living specimens grown from seeds are exhibited:

- (i) *Ferocactus latispinus* Britt. and Rose. Seeds were obtained in 1939. Plants one year old.
- (ii) *Echinocactus Leninghausii* K. Schum.
- (iii) *Echinocactus saglionis* Cels.
- (iv) *Echinocactus tubiflorus* Z. et D. (Hort.).

Seeds of the three above species were obtained from Germany in 1937. Plants three years old.

II. *An illustrated volume of 'Plantae Asiaticae Rariores' by Dr. Nathaniel Wallich, F.R.S., and his correspondence relating to the collection from 1815-1816.*

Dr. Nathaniel Wallich, F.R.S., originally surgeon to the Danish Settlement at Serampore for 30 years, held the charge of Superintendent, Royal Botanic Garden, Calcutta. Dr. Wallich was an able and most energetic botanist, who during the earlier part of his term of office organised collecting expeditions into the remote and then little known regions of Kumaon, Nepal, Sylhet, Tenasserim, Penang and Singapore. Dr. Wallich, in fact, undertook a botanical survey of a larger part of the Indian Empire. The materials (in the shape of dried specimens of plants) thus accumulated were taken by Dr. Wallich to London; after being named there by himself and by other botanists, they were distributed in numbered collections to the leading botanical institutions in Europe. Besides distributing these enormous collections, Dr. Wallich was enabled, through the munificence of the Honourable Company, to publish under the title 'Plantae Asiaticae Rariores', three superb volumes illustrated by coloured figures of a high degree of excellence. Dr. Wallich retired in 1846 and died in 1854.

Dr. Wallich's correspondence is embodied in 18 volumes from 1794-1829. One of these, from 1815-1816, and one volume of his 'Plantae Asiaticae Rariores' are exhibited.

III. *Investigation on the origin of 'Aguru-scent' in the woody tissue of Aquilaria agallocha Roxb. by Drs. S. R. Bose and K. P. Biswas.*

The well-known scent *Aguru* is manufactured from a gummy substance produced by the action of fungus—*Fungi Imperfecti*,

inside the woody tissue of the Aguru tree—*Aquilaria agallocha* Roxb.—a tree of Assam forests. This fungus enters the plant through a damaged part of the tree often caused by breaking of branches. Dr. S. R. Bose has been successful in isolating and making pure culture of the fungus in artificial media in his laboratory. Nature of the fungus mycelia producing Aguru gum is shown under the microscope. Young plants of Aguru have been successfully raised in the garden from seeds. One of these plants together with a specimen of wood containing the gum is also exhibited.

9. SCHOOL OF TROPICAL MEDICINE.

Mounted sheets of medicinal and poisonous plants.

1. *Artemisia brevifolia* Wall.
2. *Artemisia maritima* Linn.
3. *Vicia sativa* Linn.
4. *Holarrhena antidysenterica* Wall.
5. *Artemisia absinthium* Linn.
6. *Inula racemosa* Hook.
7. *Plantago psyllium* Linn.
8. *Digitalis purpurea* Linn.
9. *Digitalis lanata* Ehrh.
10. *Rauwolfia serpentina* Benth.
11. *Jurinea macrocephala* Benth.
12. *Colchicum luteum* Baker.
13. *Crocus sativus* Linn.
14. *Saussurea lappa* Clarke.
15. *Aconitum heterophyllum* Wall.

10. ZOOLOGICAL SURVEY OF INDIA.

1. Fishes: Exhibit No. 1.—Panel from the Fish Gallery of the Indian Museum showing illustrations of some indigenous and exotic fishes used in the Control of Mosquitoes in India.

Several devastating diseases of man, such as Malaria, Filaria, Yellow Fever, etc. are transmitted through the agency of mosquitoes, and it is, therefore, of paramount importance to be able to control their numbers, and especially of the speckled-winged species, the Anophelines, which are responsible for the spread of Malaria. Several agencies have been employed in all tropical countries to combat the mosquito nuisance, and various types of fishes have been found useful in this connection. The small, hardy and rapidly breeding species of larvicidal fish feed actively on their larvae and pupae, while the algivorous forms reduce the available food materials of the mosquito larvae.

The species of fish illustrated on this panel represent some of the better known forms, both indigenous and exotic, which have been used in India for mosquito control. Of the indigenous species, the 'Top Minnows'—*Panchax*, *Aplocheilichthys* and *Aphanius*—are the most suitable, while the 'Carp Minnows'—*Puntius*, *Laubuca*, *Esomus*, *Branchydanio*, *Rasbora*, etc.—are also useful. Other small fish, such as *Badis*, *Ambassis*, *Macropodus*, *Ctenopoma*, *Anabas* and *Colisa*, are also known to feed on mosquito larvae. Finally the young of practically all fish devour mosquito larvae.

Of the exotic species, the 'Barbodos Millions', *Lebistes reticulatus*, and the 'Top Minnow', *Gambusia affinis holbrooki*, have been imported into India. The former did not flourish under Indian conditions, but considerable stocks of the latter are now available in different parts of the country.

Exhibit No. 2.—Panel from the Fish Gallery of the Indian Museum showing illustrations of the principal types of poisonous fishes (mostly marine) of India.

Fish form a very popular and essential part of the diet of various classes. The roe, milt, liver, other internal organs and even the flesh of certain species, especially during the breeding season, contain toxic substances chemically allied to the toxins of the poisonous mushrooms. Such toxins, when taken with the food, attack the nerves of the stomach walls, causing violent spasms of that organ and shortly afterwards of other muscles of the body. The spasms are very often followed by a state of collapse and sometimes result in death in from one to six hours. No antidote is known, but administration of strong emetics with suitable stimulants to prevent collapse are recommended to counteract the poison.

Among poisonous fishes, particular attention may be directed to Puffers, Globe- or Balloon-fishes (Tetraodontidae), Porcupine-fishes (Diodontidae), Box- or Trunk-fishes (Ostraciontidae), Trigger-fishes (Balistidae), File-fishes or Leather-jackets (Monacanthidae), Wrasses (Labridae) and Parrot-fishes (Scaridae). The flesh of Puffers and Porcupine-fishes is always more or less poisonous, even when cooked, and should be strictly avoided. In Wrasses and Parrot-fishes the flesh is usually wholesome, but becomes dangerous when these fishes have been feeding on poisonous mussels, echinoderms, polyps, etc.

It may be added that owing to their very rich fat contents the roes of some of our highly prized food fishes, when eaten in excessive quantities, stimulate conditions of ptomain poisoning by producing violent purging and vomiting.

Various kinds of poisonous fishes illustrated on the panel are remarkable in possessing very gaudy colours, extraordinary forms and other structural peculiarities.

Exhibit No. 3.—Two pictures from the Fish Gallery of the Indian Museum showing attachment of eggs and buccal incubation in fishes.

Fishes normally spawn in water without in any way caring for the progeny. In a few cases, however, the parents look after and nourish the young.

In *Oryzias melastigma* (♀) and *Kurtus gulliveri* (♂) the eggs, after extrusion, become attached to the body of one of the parents by means of thread-like structures; while in *Platystacus aspredo* (♀) and *Syngnathoides biaculeatus* (♂) the ventral surface becomes spongy during the breeding season and the eggs are carried attached to it. In a variety of fishes the eggs are incubated in the mouth, generally by the female, but in some species, such as *Arius jaitus* and *Osteogobius militaris*, the male performs this duty.

II. *Corals : Exhibit No. 1.—Some of the more common types of corals occurring in the Indian Littoral.*

Some of the more common types of corals occurring in the Indian Littoral: 1. Stag-horn Coral, 2. Platform Coral, 3. Brain Coral, 4. Mushroom Coral, 5. Fan Coral, 6. Organ-pipe Coral, 7. Precious Coral, and 8. Soft Coral are exhibited here. They are all of animal origin, and the exhibits represent the skeleton of the various species, a skeleton which the body of the animal invests in life in a variety of ways. In the Soft Coral the skeleton is very minute and is in the form of calcareous rods of various designs. The exhibits convey a very poor idea of the living coral colonies at the sea bottom, but in Exhibit No. 2 are shown the brilliant natural colours of living corals as seen on reefs in the shallow parts of our coasts and archipelagoes.

Exhibit No. 2.—(a) Picture of the reefs skirting the Maldive Islands showing living corals in their natural colours.

Picture of the reefs skirting the Maldive Islands showing living corals in their natural colours. Dead coral rocks may be seen jutting out of the water in the background.

Exhibit No. 2.—(b) Picture of a coral garden at the bottom of the sea showing corals and marine animals.

Picture of a coral garden at the bottom of the sea showing various types of corals and associated marine animals. In this picture may be seen the tree-like horny red-coral in the upper half, the cake-like mushroom coral at the right hand left corner, the olive-grey soft coral in the centre, the gaping giant clams with their fleshy coloured mantle showing along the sinuous gape of the thick shell-valves, and the sea-anemone with the expanded green tentacles at the lower end.

III. *A pest of cauliflowers from Dhappa near Calcutta.*

This moth, *Prodenia littoralis* Boisd., is a serious pest of cauliflower, tobacco, castor, jute, etc. and recently did great deal of damage to the cauliflowers and other vegetables grown at Dhappa near Calcutta. Various stages of the life-cycle are exhibited.

Eggs of the pest laid in clusters on leaves are covered with buff-coloured hairs derived from the body of the female moth. The eggs hatch after three or four days into small blackish-green larvae. After about three weeks the full-grown larvae burrow into the earth two inches below the soil and pupate. The adult moth emerges in about a week's time. The whole life-cycle takes about a month to be completed.

Control.

(a) Hand-picking of egg masses and batches of young larvae before these spread to fresh areas;

(b) Segregating affected area by narrow steep-sided trenches to prevent the spread of caterpillars; and

(c) Destroying adult moths by light traps before they copulate and lay eggs on unaffected crops.

IV. *Wooden Effigies (Ghandāo of the Kaffirs of the Hindukush Mountains).*

The Kaffirs (called so by their Moslem neighbours) live in the valleys of the Hindukush mountains and speak archaic forms of the Indo-Aryan language and are divided into two distinct groups—the Red and the Black Kaffirs.

They are both longheaded and light skinned, many of whom possessing blue eyes and light brown hair. Their religion has many similarities with that of the Ṛk Veda; but at the present time, with the exception of the villages of Kunisht in the Rambur, and Brimatol in the Bamboret valleys of Chitral, the rest have all been converted to Islam.

One of their customs is the practice of erection of wooden effigies in memory of the dead.

The erection of the Effigies takes place in the following manner:—

A year after death in the beginning of autumn, when the leaves begin to fall, the Effigy (Ghandāo) is put up, usually by the son, when a great feast takes place and several bulls and goats are killed. The Effigy is first dressed in red clothes and is brought to the dancing platform (Parai) in the morning, and men and women drink milk and wine and dance, (with the exception of children and the widow of the dead), singing songs in praise of the dead. After the dance the Effigy is carried by all the villagers in the evening to the Muteh Muh (the place where the Effigies are placed) and put up there.

The Effigies are only put up by the Red Kaffirs.

The two figures exhibited here were procured from the village of Rambur by the expedition sent by the Z.S.I. in 1929. They represent a man, riding a horse and a woman wearing the characteristic horned headdress (Jōh) of the Red Kaffir women.

V. *Human Remains from an Ancient Cemetery of the Mauryan Period at Ujjain (Rajputana).*

A large number of human remains have recently been unearthed by the Archaeological Department of the Gwalior State in the course of excavations at a Mauryan site at Kumhar Tekri near Ujjain. This is the only place in India where human remains belonging to the Historical Period have so far been found, with the exception of the skeletons discovered by Sir John Marshall at the Dharmarajika Monastery at Taxilla.

As calculated from long bones the ancient Ujjain man appeared to be of tall stature and his headshape was long. The eyebrow regions were very well developed in some cases, and the nose highly pitched. Compared however to the ancient Taxilla man, the vault of the cranium was lower and the cubic capacity much smaller.

The great development of the posterior parts of the skull so characteristic of the big-brained races of the Indus Valley and Sumeria during Chalcolithic times, is not found among the Ujjain and Taxilla men of the Historical Period.

The specimen exhibited here represents one of the best preserved male skulls from Ujjain.

11. ROYAL ASIATIC SOCIETY OF BENGAL.

I. *Some interesting Manuscripts with paintings, etc., from the Persian Section of the Society's collection.*

(1) *Shāh Nāma*.—A valuable old copy of the great work of Abu'l-Qāsim Ḥasan Firdausī, died A.H. 411 (A.D. 1020). It is written

calligraphically and contains several curious miniature paintings finished in the Tātār style.

(2) *Ā'in-i-Akbarī* by Abu'l-Faḍl 'Allāmī, containing a description and a statistical account of the Moghul Empire under Akbar. Two full-page miniatures in the beginning. About 300 years old.

(3) *Bādshāh Nāma*, Vol. II, by 'Abdu'l-Ḥamid Lāhūrī. It contains the history of Emperor Shāh Jahān's reign, comprising the years A.H. 1047–1057 (A.D. 1638–1647).

Copied by Muḥammad Šālih al-Kātib. Bears an autograph of the Emperor Shāh Jahān (A.H. 1037–1069, A.D. 1628–1659).

(4) *Amīr Nāma* by Basāwan Lāl, surnamed Shādān of Bilgrām, containing a biography of an Afghān chief, Amīru'd-Daula Muḥammad Amīr Khān.

Copied in A.H. 1251 (A.D. 1835) by Khairiyat Khān. Contains several pictures.

(5) *Tarjuma-i-Mahābhārata*.—A translation of the Mahābhārata, different from the well-known version prepared in Akbar's time. Probably prepared by a Hindū gentleman.

About 150 years old. Contains several pictures.

II. A few old Arabic Manuscripts from the Society's collection.

(1) *Kitāb al-Qirā'āt as-Sab'a*.—A work on the seven recognised schools of the different ways of reciting the text of the Qur'ān. The MS. is incomplete both at the beginning and at the end. On fol. 4 the author states that he studied at Baghdād under Ibrāhīm bin Aḥmad al-Kharqī in A.H. 372 (A.D. 983). Many words are written without diacritical marks. On the other hand, the letters *rā*, *dāl* and *ṣād* often have a dot under them, and letter *sīn* has three dots. It was apparently written in the 11th Century of the Christian era.

(2) *Al-Madkhal*.—A critical work on Ḥadīth (Sayings of the Prophet) and on different theoretical matters connected with the study of the subject by Aḥmad bin al-Ḥusain al-Baihaqī, died A.H. 458 (A.D. 1066). Apparently no other copy of this work is known. The MS. is dated A.H. 635 (A.D. 1238). At the last fol. it bears the hand-writing of the famous traditionist Ibn Šalāh, died A.H. 643 (A.D. 1245).

(3) *Al-Jam' Bayn as-Šaḥīhain*.—A very rare work on the Sayings of the Prophet. It is a combined edition of the two most authentic works on Ḥadīth called *al-Jāmi' as-Šaḥīh* of al-Bukhārī and *as-Šaḥīh* of Muslim. The author of the work is Abū 'Abdullāh Muḥammad bin Abi Naṣr al-Andalusī, died A.H. 488 (A.D. 1095). It was transcribed at Damascus in A.H. 642 (A.D. 1245).

(4) *At-Tahdhīb fī Tafsīr al-Qur'ān* by Abū Sa'īd al-Muḥsin al-Baihaqī, died at Mecca in A.H. 491 (A.D. 1101). It is a detailed commentary on the Qur'ān. The MS. is dated A.H. 674 (A.D. 1275).

(5) *Al-Ikhtisār wa't Tajrīd*.—An abbreviation and partly a revised edition of a work on Ḥadīth called *al-Jam' bain as-Šaḥīhayn*. The author of this abridgement is Abū 'Abdullāh Muḥammad bin Uthmān as-Shāfi'ī. It is an autograph copy, completed in A.H. 728 (A.D. 1328).

III. A number of old Sanskrit Manuscripts belonging to the Society's collection.

(1) Circa 7th–8th Century.

(i) Kubjikāmata (A.S.B. VIII. 5804).

(2) *Circa 10th Century.*

(i) Maitreyavyākaraṇa (A.S.B. I. 14). Copied in Gopāladeva Saṃvat 57.

(3) *Circa 11th Century.*

(i) Samputodbhava-kalparāja (A.S.B. I. 62). Copied in N.S. 145 (1025 A.D.).

(ii) Pratiṣṭhāpaddhati (A.S.B. III. 2465). Copied in N.S. 211 (1091 A.D.).

(iii) Yuddhajayārṇavatāntra (A.S.B. VIII. 6110). Copied in N.S. 217 (1097 A.D.).

IV. *Some Tibetan books of interest from the Society's collection.*(1) *Four immortal Taoists.*

These are the pictures of the Chinese Taoist immortals, who possessed supernatural powers, and could change their forms in any way they liked.

Fig. 150 shows one man on the back of a mule representing Chang Ko Lao. He is the Grand Minister of the Emperor Yao (2357–2255 B.C.). The woman standing behind Chang Ko Lao in the picture is Ho Sien Ku, a famous female Taoist immortal, who lived in the time of Tang dynasty (A.D. 684–705).

Fig. 149 of the picture represents Lu Tung Pin, who could fly in the air. He was born in A.D. 755. The next man represents Han Chong Li who lived in A.D. 1101–26. These four people mentioned above belong to the eight immortals of Chinese Taoists.

(2) *Tibetan book written in gold.*

This is a holy book written in gold on Transcendental wisdom, or *Aṣṭaśaṣṭikāpraiṇāpāramitā* and is composed of eight thousands of the dharma. It is a favourite holy book of the Tibetans who show particular reverence to it as it is written in golden ink.

(3) *The Feast of Peaches.*

A picture of Pantao festival of Hsi Wang Mu, the Western Royal Mother or Queen of the West Air. At the birthday of the Queen all the gods and goddesses, the immortals, the dragon kings, and their followers assemble and make offerings to the Queen.

V. *The Society's Publications in 1939.*(1) *Journal:—*

(a) Letters, (b) Science, (c) Year-Books.

(2) *Bibliotheca Indica:—*

(a) Arabic and Persian.
(b) Sanskrit.
(c) English Translations.

(3) *Proceedings, Indian Science Congress.*(4) *Catalogues of Manuscripts:—*

(a) Arabic collections.
(b) Sanskrit collections.

VI. Some recent publications by members of the Society.

1. Sir John Marshall and A. Foucher. The monuments of Sanchi, Vols. I, II and III, Calcutta, 1939.
 2. Raghubir Sinh: Indian States and the new Regime.
 3. Raghubir Sinh: Sapta Dip, 1939.
 4. Raghubir Sinh: Malwa me Yugantar, 1939.
 5. Raghubir Sinh: Sesh Smritiyan, 1939.
 6. Sir S. Radhakrishnan: Mahatma Gandhi, 1939.
 7. Sir S. Radhakrishnan: Eastern Religion and Western Thought, London, 1939.
 8. S. K. Chatterji: Bhasa Prakas Bangla Vyakaran, Calcutta, 1939.
 9. L. S. Dugoin: Les Contes du Perroquet, Paris, 1939.
 10. J. B. Chaudhuri and Mrs. R. Chaudhuri: Sanskrit Poetesses, Part A, 1939.
 11. Bimala Churn Law: Kausambi in ancient Literature, 1939.
 12. Bimala Churn Law: Rajagriha, Delhi, 1938.
 13. K. Biswas and C. C. Calder: Handbook of Common Water and Marsh Plants, 1939.
 14. R. P. Chanda and J. K. Majumdar: Selections from Official Letters and Documents relating to the Life of Raja Rammohun Ray, Vol. I, 1939.
 15. S. M. Bose: The Working Constitution in India, Oxford, 1939.
 16. J. P. Mills: The Rengma Nagas, London, 1937.
 17. J. Ph. Vogel: Buddhist Art in India, Ceylon and Java, Oxford, 1936.
 18. O. C. Gangoly: The antiquity of the Buddha Image.
 19. K. N. Dikshit: Excavation at Paharpur, Bengal, 1938.
 20. B. L. Bhatia: Protozoa; Sporozoa, London, 1938.
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ANNUAL REPORT FOR 1939.

The Council of the Royal Asiatic Society of Bengal has the honour to submit the following report on the state of the Society's affairs during the year ending the 31st December, 1939.

Before commencing the report proper the Council desires to place on record the great loss which the Society suffered during the year by the untimely death of His Excellency the Right Honourable Michael Herbert Rudolph Knatchbull, G.C.S.I., G.C.I.E., M.C., Baron Brabourne, Governor of Bengal. For the space of one short year he was not only the Society's gracious Patron but also one of its most esteemed Ordinary Members. Requiescat in pace.

During the year under review the most important event to record was the re-organisation and overhauling of the work of the Society as a result of which considerable changes have taken place in the administration and staff. It was felt for some time past that there was a general slackness both in the daily routine work and publications of the Society which had caused dissatisfaction among its members and well-wishers. To enquire into these a Special Enquiry Committee of nine was appointed by the Council on the 27th of Feb., 1939 under the Chairmanship of Sir John Lort-Williams, Kt., K.C., with Dr. Baini Prasad, D.Sc., F.N.I., F.Z.S., F.R.S.E., F.R.A.S.B., as its Secretary. This Committee met 15 times and after strenuous labours lasting for 5 months submitted its final report which was unanimously adopted by the Council at its meeting held on August 10, 1939. After reviewing the entire work of the Society during the last 20 years the Committee came to the conclusion that the system of administration disclosed clear evidence of serious and fundamental defects which had undoubtedly caused damage to the Society, and recommended a return to the practice of having an Honorary General Secretary with two paid whole time Assistant Secretaries, one in charge of the intellectual work and the other that of the office and the business side of the Society's activities. Its other recommendations dealing with the organisation of the office, co-ordination of the scales of pay and definition of the duties of each member of the staff, publications both with regard to the arrears and the regularity of the appearance of the Journal and the Memoirs, the immediate and urgent necessity of repairing a

large number of valuable rare books and manuscripts in the collection of the Society, the installation of steel shelves for housing them, the preparation of scientific catalogues of the Society's books and manuscripts, Finance, and a scrutiny of the Rules and Regulations of the Society, etc. are discussed below in the various sections dealing with these heads.

Mr. Johan van Manen, C.I.E., F.R.A.S.B., who had held the office of General Secretary since 1923 resigned on June 30, 1939, and Dr. B. S. Guha, M.A., A.M., Ph.D., F.N.I., F.R.A.S.B., was appointed General Secretary from the 1st of July, 1939. Mr. J. R. Seal, M.B.E., was confirmed in his appointment as Asst. Secretary from the 1st of July, 1939 for a period of five years, on a monthly salary of Rs.300 and was placed in charge of the office and the business interests of the Society. The appointment of a second Asst. Secretary in charge of the intellectual activities could not be made immediately owing to heavy financial commitments that the Society was compelled to undertake in carrying out the recommendations of the Special Enquiry Committee.

Ordinary Members.

Gains and Losses.—These were as follows during the year:—

<i>Gains.</i>		<i>Losses.</i>	
Elections carried forward	.. 1	Elections carried over	.. 7
New elections	.. 28	Deaths	.. 3
		Resignations	.. 16
		Rule 40	.. 5
			..
TOTAL	.. 29	TOTAL	.. 33

Initial total 390; net loss 4; final total 386.

Rule 38.—This Rule, dealing with members whose subscriptions are in arrears, was strictly applied and the names of four members were removed from the roll for this cause.

Membership List.—The customary detailed checking of the membership lists with the membership card index was made at the end of the year.

Non-resident Members.—Their total at the end of the year was 103.

Life-members.—The total of our Life-members has remained the same, namely 54; one was lost by death and one has newly compounded.

Deaths.—Amongst the distinguished and especially valued members lost to us, whose memory will be cherished, and for whose departure the Society is the poorer, the following may be mentioned:—

1. Lord Brabourne, (1938).
2. W. R. Ciper, (1887).

Associate Members.

The following new Associate Members were elected:—

1. Rev. William Pettigrew.
2. Miss Maude Lina West Cleghorn.

The present number stands at 6, the statutory maximum is 15.

Special Anniversary Honorary Members.

Our ten Special Anniversary Honorary Members have remained the same.

Institutional Members.

No new accessions to this class were enlisted. Their number is 12.

Ordinary Fellows.

At the Annual Meeting held on the 6th February, 1939, the following members were elected Ordinary Fellows:—

- Dr. C. S. Fox.
Dr. B. S. Guha.

We lost through death the following Ordinary Fellow:—

- Rev. P. O. Boddington, (1926).

At the end of 1939 the number of Ordinary Fellows was 46; the statutory maximum is 50.

Honorary Fellows.

The following were elected Honorary Fellows:—

- Sir S. Radhakrishnan, Kt.
Prof. Dr. Heinrich Leuders.
The Most Hon. the Marquess of Zetland.
Sir Jadunath Sarkar, Kt.

One Honorary Fellow was lost by death:—

- G. A. Boulenger, (1916).

The number at the end of the year was 22; the statutory maximum is 30.

Condolences.

The Council sent letters of condolence to the relatives of the following:—

- His Excellency Lord Brabourne, Governor of Bengal.
Dr. Walsper Horn, and
Sir Abdul Kerim Ghuznavi.

Council.

The Council met 15 times. The attendance averaged 14.

The following resolutions of thanks were passed by the Council:—

To Sir John Lort-Williams for services rendered to the Society and hard work performed by him as Chairman of the Special Enquiry Committee.

To all the Members of the Special Enquiry Committee for the extremely satisfactory manner in which they carried out the unusually arduous duties imposed on them by the enquiry—a task which involved a considerable amount of time and labour.

To Lt.-Col. Barwell for a donation of Rs.100 to the Library Endowment Fund.

To the outgoing Members of Council for the way in which they have served the true interests of the Society during the period of their Council Membership.

Office Bearers.

Changes in the Council were as follows:—

Dr. B. S. Guha was appointed Acting General Secretary from 25-4-39 to 1-7-39, *vice* Mr. Johan van Manen, General Secretary placed on special duty.

Mr. Johan van Manen, General Secretary resigned with effect from the 30th June, 1939, and Dr. B. S. Guha was appointed General Secretary from the 1st July, 1939.

Mr. H. C. Chakladar was appointed Anthropological Secretary with effect from 1-7-39, *vice* Dr. B. S. Guha.

Dr. B. S. Guha, Acting Honorary Treasurer from 1-4-39 to 25-4-39, *vice* Mr. Percy Brown, absent.

Dr. Baini Prashad, Acting Honorary Treasurer from 25-4-39 to 1-10-39, *vice* Mr. Percy Brown, absent.

Dr. Baini Prashad, Acting General Secretary from 7-10-39 to 26-11-39, *vice* Dr. B. S. Guha, absent.

Absences other than those mentioned above were:—

Maharajadhiraja of Burdwan, absent from June to 1st week of October.

Sir John Lort-Williams, absent from August to the beginning of December.

Lt.-Col. Barwell, absent from the middle of August to November.

Dr. J. N. Mukherjee, absent from 10-5-39 to 15-6-39.

Sir U. N. Brahmachari, absent from 15-5-39 to 24-6-39.

Committees of Council.

The Standing Committees of Council, namely, the Finance, Publication, and Library Committees, met monthly, with the exception that the last two committees did not meet in the recess month of October.

A Special Enquiry Committee consisting of Sir John Lort-Williams (Chairman), Dr. Baini Prashad (Secretary), Dr. M. N. Saha, Dr. S. P. Mookerjee, Dr. J. N. Mukherjee, Dr. C. S. Fox, and the *ex-officio* members, to enquire into the general administration and cultural activities of the Society—and to submit to the April Meeting of Council a detailed report with recommendations, if any, for effecting necessary improvements and also

to report on the alleged discrepancies between Rules and Regulations on the one hand and existing procedure and practice of the Society on the other.

The following sub-committees were appointed:—

(1) A sub-committee consisting of Dr. S. K. Chatterjee, Dr. M. Hidayat Hosain, and the General Secretary to frame suggestions for submission to Council regarding a proposal for instituting an Indian Academy of Arts and Letters.

(2) A sub-committee consisting of Dr. Baini Prashad, Dr. M. Hidayat Hosain and the General Secretary to consider the purchase of Persian and Arabic MSS.

(3) A sub-committee consisting of Col. R. N. Chopra, Sir U. N. Brahmachari and Major C. L. Pasricha to put up proposals before the Council with regard to the resuscitation of the Society's Medical Section.

Finance Committee.

The Finance Committee met on dates different from, and a few days prior to, those of the Council Meetings.

One Special Meeting was held in December to frame the budget for 1940.

Office.

The office organisation of the Society received the very close and careful attention of the Special Enquiry Committee. It was found that a general lack of system, co-ordination and supervision had affected the staff and considerably reduced its efficiency. Hitherto no serious attempt had been made to co-ordinate the scales of pay, or to maintain adequate establishment records, and thus to ensure a contented and harmonious office establishment. After carefully considering the length of service, age, capabilities, duties and general character of each member of the staff, the Committee recommended, and the Council sanctioned, the following posts:—

- (a) An Assistant Secretary (to be increased later to two).
- (b) Librarian.
- (c) Press Clerk.
- (d) General Clerk.
- (e) Cashier.
- (f) Steno-typist.
- (g) Typist.
- (h) File-clerk and Despatcher.
- (i) Pandit.
- (j) 2nd Pandit.
- (k) Maulvi.
- (l) 2nd Maulvi.
- (m) Sino-Tibetan Clerk.

Menials.

- 5 Daftries.
- 1 Jama'dar.
- 1 Darwan.
- 4 Peons.
- 5 Bearers (plus 1 temporary).
- 3 Sweepers.
- 1 Bill Collector.
- 1 Mali.

The Committee also defined the duties to be allotted to each post. In addition the Committee recommended the preparation of an Office Manual, and the maintenance of service books and annual confidential reports.

The adoption of the Committee's recommendations entailed the retirement of the Librarian, B. L. Dutt, who had served for about 28 years, and the retrenchment of M. M. Khan, despatcher, who had served for nearly two years. The former was granted a gratuity of six months' pay in addition to his Provident Fund accumulations, and the latter a gratuity of two months' pay.

Revised scales of pay as under, were introduced, to take effect from the 1st January, 1940.

- | | | |
|--------------------------------------|---------------|----------------|
| (a) Librarian | .. | Rs. 150—10—250 |
| (b) Senior Clerical Grade | .. | Rs. 100— 5—150 |
| Press Clerk, | | |
| General Clerk, | | |
| Cashier. | | |
| (c) Junior Clerical Grade | .. | Rs. 50— 3— 80 |
| Steno-Typist, | | |
| 2nd Maulvi, | | |
| 2nd Pandit, | | |
| File-clerk and Despatcher, | | |
| Typist, | | |
| Sino-Tibetan Clerk. | | |
| (d) Special Indological Appointments | Rs. 75— 5—125 | |
| Pandit, | | |
| Maulvi. | | |

No change was made in the existing scales of pay of the menial staff. For the typist, who had served for nine years on the maximum of his grade without any advance, a personal allowance of Rs.10 per mensem was sanctioned.

With regard to the Assistant Secretary, in charge of the Office and business activities of the Society, the present incumbent, Mr. J. R. Seal, M.B.E., was confirmed in his appointment from the 1st July, 1939, the date from which Mr. Johan van Manen resigned, for a period of five years, on Rs.300 a month, and a

contract specifying the conditions of his appointment, and including a clause regarding termination of service on three months' notice on either side, was executed.

Correspondence.—The number of outgoing letters issued was 4291, and 3393 were received. The Special Enquiry Committee found that in the past a large amount of correspondence had either remained unanswered, been mislaid, or had been kept in 'pending' files. Under their direction those items on which effective action could be taken have received attention, and the remainder correctly filed. It can be stated now with satisfaction that all current correspondence is being adequately and expeditiously dealt with.

Stock-rooms.—On the recommendation of the Special Enquiry Committee it was decided to replace the old wooden racks in the stock-room by modern steel-shelving as also in the south portion of the Office and throughout the Library. The work was commenced in November and the installation in the main stock-rooms is now almost completed.

General.—No other changes of importance in regard to the Office took place, and the routine work in respect of distribution of the Society's publications, addresses, card register, circulars and forms requires no special comment except that the distribution of Journals, etc. to neutral countries was held up for some time after the outbreak of war in September owing to the necessity, under censorship regulations, of obtaining books of permits for their transmission through the post.

Rules and Regulations.

This matter was fully considered by the Special Enquiry Committee who found that no amendments to the Rules are necessary. The Regulations, however, were found to require both amendments and amplifications—a duty which, under the Rules, devolves on the Council. The Special Enquiry Committee, as recorded in detail under 'Publications' in this report, drew up revised regulations regarding the submission of communications for publication. It also recommended the formation of a Special Bibliotheca Indica Committee and defined its aims and objects. The Committee also found that Rule 48(f) had not hitherto been strictly adhered to in the past and it defined the correct procedure to be followed in future with regard to the preparation of the Annual Report.

Indian Science Congress.

From the beginning of the year under review the administration of the Indian Science Congress was taken over by that body. There were a number of matters connected therewith which had to be dealt with during the earlier months of the year

by the Society in its capacity as the former managing agency of the Congress, but these had all been completed by the end of April, 1939, with the exception of the issue of the Proceedings, Part II, Presidential Addresses of the 26th Indian Science Congress, Lahore, which were published before the end of June, 1939.

Representations.

Indian Museum.—The Society's representative on the Board of Trustees of the Indian Museum, under the Indian Museum Act, X of 1910, continued to be Rai Sir Upendra Nath Brahmachari Bahadur, Kt.; who was re-appointed for a further period of three years.

Kamala Lectureship.—The Society's nominee to serve on the Election Committee of the Kamala Lectureship, administered by the Calcutta University, was Dr. Baini Prashad.

National Institute of Sciences of India.—The Society's representatives to serve on the Council of the National Institute of Sciences of India were Rai Sir Upendra Nath Brahmachari Bahadur, Kt., and Sir Bryce Burt.

Deputations.

The Society received invitations to send representatives to the various functions of the undermentioned bodies :—

Bicentenary Celebration of the Royal Swedish Academy at Stockholm. The Council invited Prof. Sten Konow to represent the Society.

Selection Committee for the appointment of a University Professor of Anthropology, Calcutta University. Council's nominee was Dr. B. S. Guha but in case Dr. Guha be nominated by some other body then Rai Bahadur Ramaprasad Chanda.

Seventh International Congress of Genetics at Edinburgh in August, 1939. The Council invited Sir Thomas Holland, Lt.-Col. Grieg and Lt.-Col. A. D. Stewart to arrange amongst themselves for a suitable representation of the Society at the Congress.

Indian Historical Records Commission at Calcutta on 15-12-39. The Council invited Dr. D. R. Bhandarkar, Dr. U. N. Ghoshal and Dr. R. C. Majumdar to represent the Society.

The Eighteenth International Geological Congress to be held in London in 1940. The Council invited Dr. A. M. Heron to represent the Society.

The Fiftieth Anniversary Celebration of the Catholic University of America. The Council sent the usual good wishes of the Society.

Congratulations.

The Society sent its cordial congratulations to the following:—

To Bt.-Col. R. N. Chopra for the distinction conferred upon him by the Belgian Society for Tropical Medicine in Antwerp.

Visits.

An appreciable number of distinguished visitors came to the Society. Amongst them were scholars from Japan, France, the United States of America, Syria and Turkey, and also the Library Training Class.

A large number of members of the Indian Historical Records Commission, Calcutta, 1939, visited the Society in December, and a special display of the Society's historical possessions was made for their inspection.

H.E. the Governor of Bengal.

The incoming Governor of Bengal, His Excellency Sir John Arthur Herbert, G.C.I.E., graciously accepted the invitation extended to him to accept the Office of Patron of the Society.

Social Functions.

No social functions were held by the Society during the year.

The Society continued the practice of providing light refreshments to the Members and visitors present before the Ordinary Monthly Meetings.

Awards.

Elliott Prize for Scientific Research.—The annual prize offered for the year 1937 was for research in Physics. Three candidates submitted papers. The Trustees recommended that none of the essays submitted was of sufficient merit to be awarded the prize.

The prize offered for the year 1939 was for Geology and Biology (including Pathology and Physiology). An announcement regarding the prize will be made at the Annual Meeting of 1940.

The prize for next year, 1940, will be for research in Mathematics.

Barclay Memorial Medal.—The (biennial) award of the Barclay Memorial Medal for conspicuous contributions to Medical and Biological Science with reference to India, for 1939, will be announced at the Annual Meeting of 1940.

Sir William Jones Memorial Medal.—The next (triennial) award of the Sir William Jones Memorial Medal for Asiatic Researches in Science will be announced at the Annual Meeting of 1941.

Annandale Memorial Medal.—The next (triennial) award, for important contributions to the study of Anthropology in Asia, will be announced at the Annual Meeting of 1940.

Joy Gobind Law Memorial Medal.—The triennial award of the Joy Gobind Law Memorial Medal for 1938, for conspicuously important work on Zoology in Asia, was announced at the Annual Meeting of 1939. The medal was bestowed on Dr. Baini Prasad, Director, Zoological Survey of India.

The next (triennial) award will be announced at the Annual Meeting of 1942.

Paul Johannes Brühl Memorial Medal.—The (triennial) award for important contributions to the study of Asiatic Botany for 1937 of the Paul Johannes Brühl Memorial Medal (deferred from previous year) was announced at the Annual Meeting of 1939. The medal was bestowed on Sir David Prain, Kt., F.R.S., late Director, Royal Botanic Gardens, Kew, Surrey, England.

The next (triennial) award will be announced at the Annual Meeting of 1942.

Indian Science Congress, Calcutta, Prize.—The next award will be made in connection with the next session of the Congress to be held in Calcutta.

Pramatha Nath Bose Memorial Medal.—The Council has not as yet decided on the year in which the initial award of the Pramatha Nath Bose Memorial Medal for conspicuously important contributions to practical or theoretical Geology with special reference to Asia shall be made.

Society's Premises and Property.

A sum of Rs.2,000 was set aside during the year for credit to the Building Repair Fund. The Special Enquiry Committee made recommendations in respect of this Fund and the Building Fund to which further reference is made under the head of Finance later on in this report.

General repairs to the office premises were carried out by Messrs. Martin & Co. at a cost of Rs.4,441-1-0.

A new lavatory in the compound for the use of the Staff was installed by Messrs. J. B. Norton & Co., Ltd., at a cost of Rs.985-4-0. The same firm also put in a small stand pipe for unfiltered water for flushing the external drains at a cost of Rs.331-12-0.

A new table was acquired for the Joint Philological Secretary and one of the existing tables was renovated for Prof. Chintaharan Chakravarti. The members' retiring room and lavatory were furnished with new curtains, and a screen for the same room was also provided, together with a brass plate 'Members Only'. In the main hall the plaster plaque 'Sir William Jones translating Sakuntala' was remounted on a suitable stand and re-painted. A revolving stand was provided for the historical letter of James Prinsep to Dr. W. H. Mill in which he announced his epoch-making discovery of the decipherment of the Brahmi Script of the Asokan Edicts and presented to the Society by the latter's grandson, Dr. Clement C. J. Webb.

With regard to the busts in the main Hall and on the landing a re-arrangement was made, the pedestals were re-painted, marble plaques bearing the names and dates were affixed where these did not already exist, and all the existing names were re-lettered in black. The two marble plaques at the entrance door were cleaned and re-lettered. This work was satisfactorily carried out by Messrs. Llewellyn and Co.

Artistic and Historical Possessions.

An original letter of historical value of James Prinsep, which has been referred to under 'Society's Premises and Property' was received through the courtesy of Dr. Clement C. J. Webb, the grandson of Dr. W. H. Mill, to whom the letter was addressed, and who was a Vice-President of the Society from 1833-1837.

Through the courtesy of His Excellency Sir John Herbert, G.C.I.E., Governor of Bengal, and Patron of the Society, the famous Bhowal copper-plate of Lakshmana Sena was brought back from the India office to the Society after an absence of over one hundred years. The Society is not only indebted to its gracious Patron, but also to Dr. Nalini Kanta Bhattasali and Dr. H. R. Randle for their share in having brought about this desirable result. The following notice, which appeared in the public press, was prepared by the Society as a record of this historic event :—

The Sunday Statesman. November 26, 1939.

RETURN OF FAMOUS COPPER-PLATE.

CALCUTTA CEREMONY.

Governor brings Tablet from England.

An interesting ceremony took place yesterday at Government House, Calcutta, when His Excellency Sir John Herbert received a deputation from the Royal Asiatic Society, Bengal, consisting

of Sir David Ezra and Dr. Baini Prashad, and formally handed over to the Society the famous Bhowal copper-plate of Lakshmana Sena.

This plate, which until very recently had been considered irretrievably lost, was brought out from the India Office by Sir John Herbert, who undertook the mission on account of the delay and risks in transmission due to the war.

After receiving the plate Sir David Ezra said:—

‘On my own behalf and on behalf of the Council of the Royal Asiatic Society of Bengal I am very grateful to Your Excellency for bringing out the Bhowal copper-plate from England. The Society feels greatly honoured by the deep interest taken by Your Excellency and I hope that under your kind patronage the Society will continue to flourish.’

HISTORY.

A history of the plate is given below.

Mr. Walters, who was Magistrate of Dacca during the early part of last century, obtained a copper-plate of Lakshmana Sena—the Bhowal plate—from Golucknarain Rae, and presented it to the Asiatic Society, Calcutta. This presentation was announced at the May meeting of the Asiatic Society of 1829, and a reference to it was included in the proceedings of the Society for that month published in ‘Gleanings in Science’, and also in the ‘Calcutta Gazette’, dated May 14, 1829. Presumably the plate was taken to England by Mr. H. H. Wilson, who was the Secretary of the Asiatic Society up to 1832, and who, after his retirement, was appointed Librarian of India House.

No further reference to the plate has been traced until 1875 when a short account of it was published by Navinachandra Bhadra in his ‘Bhoyaler itihasa’, 1875. In 1927 Dr. Nalini Kanta Bhattasali gave full details about it in an article in the *Indian Historical Quarterly*.

The plate was thought to have been lost until June of this year when Dr. H. N. Randle, Librarian of the India Office, published an account of some copper-plates which he had discovered in a safe in the India Office, and suggested that one of these was presumably the lost Bhowal plate.

Dr. N. K. Bhattasali immediately directed the attention of the Royal Asiatic Society of Bengal to this discovery. The Society thereupon raised the question of ownership with the Library authorities at the India Office, who, after investigation of all the available evidence, admitted the Society’s claim.

Meanwhile, owing to the war, it was not considered safe to send the plate out to India, Sir John Arthur Herbert, then Governor-designate of Bengal, however, offered to bring it out with him, and through his kindness it has now been received

back in Calcutta. This is of particular importance as scholars will now be able to have early access to the plate itself, and check the reading of the inscription, photograph of which, together with a critical account are being published in 'Epigraphica Indica'.

Mr. Walter's account of the find-spot of the plate is as follows:—'About thirty miles north of the city of Dacca, a few miles above the site of the ancient fortress of Akdala, and a short distance from the banks of the river Luckiah, is situated Mowza Rajabary, appertaining the pergunah Bhowal, and included in the modern division of "thannah" Jamalpore. At this place, on the crest of a low hill, stands an ancient building called Moggee's Mut (Maghir Matha). About forty years ago (i.e. about 1790) the accompanying copper-tablet was dug up by a Koonch ryot, at a short distance from the "mut". It was conveyed to the Bhowal zemindar, Luckhenarain Rae, from whose son, Golucknarain Rae it has now been obtained'

DESCRIPTION OF PLATE.

It is a single plate measuring $13\frac{3}{4}$ by 12 inches, weighing 7 lbs., and having 59 lines incised upon it, 30 on the obverse and 29 on the reverse. A projection from the top edge, in the shape of an inverted shield or heart, carries the usual Sena device, the image of Sadasiva, 3 inches in diameter, fixed by a stout central bolt almost $\frac{1}{2}$ inch in diameter which projects about $\frac{1}{2}$ inch on the reverse

The deed was issued by the 'Maharajadhiraja Ariraja-Madanāsankara' Lakshmanasenadeva (lines 28 and 57-8). The name of the place of issue has been doubtfully read in the Madhainagar grant as Dharyyagrama. In the present plate it is again doubtful (line 24). The grant is dated the sixth day of the month Karttika in the (regnal) year 27, and was executed by Sabkaradhara, the 'Gauda-Mahasandhivigrahika' as 'duta' (lines 57-59).

It is a conveyance of land to Padmanabhadeva Sarman Pathaka . . . The motive of the gift is to win merit for the 'Mahadevi' (Queen) . . . padevi and the 'Mahadevi' Kalyanadevi (line 48).

The land conveyed consists of two adjacent estates, of the annual value of 400 'kapardaka puranas', in the Paundravardhana bhukti.

The date of the inscription, if Lakshmana Sena's reign was c. 1170-1200 A.D. must be fixed at c. 1197 A.D., and therefore very near the time of his overthrow by Muhammad Bakhtiyar.

Library.

The Library of the Society as being one of the best reference libraries in India is undoubtedly one of its greatest assets but

unfortunately its general condition was found by the Special Enquiry Committee to be far from satisfactory. Proper accession registers had not been kept and no stock-taking had been done during at least the last twenty-five years. The existing catalogues of printed books also were neither scientifically prepared nor comprehensive. In the Sanskrit and Arabic and Persian Sections, however, registers had been maintained, but owing to lack of knowledge of scientific methods of preservation of MSS. and the absence of regular periodical cleaning and examination, the pages of the MSS. had in many cases stuck together and some were attacked by worms. In the Tibetan and Chinese section of the Library it was found that although a large number of valuable MSS. and xylographs exist, nothing had been done since Mr. P. Ghosha's time, either to keep complete records, or to give them the care and attention necessary for their proper preservation.

The Committee also found that the existing wooden almirahs and shelves were not suitable for housing and preserving the valuable collections of the Library.

The Committee, therefore, recommended the following measures for adoption:

- (a) The replacement of wooden furniture by modern steel equipment for which, together with the provision of similar steel furniture for the office and stock room, an estimate of Rs.22,495, was sanctioned;
- (b) The appointment, on probation for one year, of a qualified Sino-Tibetan Clerk;
- (c) The revision of the existing authors catalogue, and the preparation of subjects and titles catalogues;
- (d) The maintenance of:—
 - (i) An Accession Register for all accessions,
 - (ii) A Register of Periodicals,
 - (iii) A Distribution List of the Society's publications;
- (e) The provision of an additional menial staff of bearers for cleaning; the purchase of modern and efficient insecticides and preservatives; and the employment of better cleaning materials;
- (f) The re-binding of all works which are damaged and moth-eaten, especially the valuable and rare books on art, architecture and scientific memoirs containing coloured plates and photogravures of great importance in the south room of the Library; and the provision in the Annual Budget of an additional allotment for this purpose;
- (g) An effort should be made to augment the Library Endowment Fund; and the possibility of selling some of the art possessions, after taking expert advice, should be considered.

In accordance with the recommendations of the Special Enquiry Committee, the Librarian, Babu Balai Lal Dutt, B.A., retired in September of this year after serving for about 28 years, and Mr. P. O. Matthai, M.A., who since his appointment in 1926 had been holding the post of Head Clerk of the Society, was appointed in his place. Immediately after his appointment, Mr. Matthai was entrusted with the task of taking stock of the printed books of the Library in addition to his daily routine work. Mr. Matthai has since been engaged in stock-taking and it is hoped that his detailed report on the state of the Library will be ready by the middle of the coming year. The Assistant Pandit who has been working hitherto as Assistant Librarian has been helping the Librarian in his routine work and will continue to do so until the stock-taking is completed.

Permanent Library Endowment Fund.—This Fund received a further donation of Rs.100 from Lt.-Col. N. Barwell during the year. The total invested capital in $3\frac{1}{2}\%$ Government Paper remains at a face value of Rs.14,000. The accumulated interest, together with the donation received, will permit the purchase of additional paper to the value of Rs.1,600 early next year.

Accessions.—The accessions to the Library during the year, exclusive of about 200 periodicals received either by exchange or purchase, numbered 294 volumes out of which 121 were purchased and the remainder were received by presentation. The allocation for the purchase of books and periodicals for the year was Rs.2,500 but actually Rs.2,595-7-6 were spent.

Binding.—The Society has in its possession a large number of extremely valuable and rare books on art, architecture, archæology and science containing priceless photogravures and coloured plates. On the recommendation of the Special Enquiry Committee, the Council sanctioned a special sum of Rs.4,000 for getting them bound and repaired and during the months ending in December 1939, 150 of these were bound and repaired at a cost of Rs.2,238-10-0. The remaining volumes will be similarly treated during the coming year. The allocation for binding was Rs.500 for the English Section of the Library.

Sanskritic Section :

In accordance with the recommendations of the Special Enquiry Committee particular attention has been paid during the year to the cleaning, preservation and repair of the old decaying MSS. Altogether 487 MSS. were cleaned and 109 damaged ones were repaired.

A fairly large number of MSS. have been made use of by scholars both in the rooms of the Society and outside. The number of MSS. lent during the year was 13. On some of the more important MSS. communications dealing with their characteristic features were made in the Monthly Meetings of

the Society. The full use made of our MSS. by scholars however cannot be estimated as the Society possesses no records to show the number of MSS. used by authors in their publications. In lending out our MSS. to scholars it would be well to stipulate in future that the use made by them of our MSS. should be formally acknowledged and copies of publications sent to the Society.

Islamic Section :

During the year the work of binding and repairing the MSS. was continued and 48 MSS. were bound making a total of 1324 bound MSS. in the possession of the Society.

One MS. was acquired during the year at a cost of Rs.10. Additions were made to our collection of reference books dealing with Persian and Arabic MSS. A number of bibliographical works of reference was purchased during the year.

Finance.

In reviewing the position of the Society with regard to its finances the Special Enquiry Committee adopted two lines of investigation, namely consideration of (a) the existing method of controlling expenditure and presenting the accounts, and (b) possible methods of increasing revenue and effecting savings.

The Committee were of opinion that sufficient attention had not been paid for some years to the desirability of increasing the Permanent Reserve Fund. This point has now been taken up and in the Budget for 1940 provision has been made for transferring Rs.5,000 from surplus funds as a result of considerable saving owing to the abolition of the post of the paid General Secretary.

With regard to the grants received by the Society from the Governments of India and Bengal the Committee found that prior to 1925 each fund was charged with the amounts of relevant expenditure in detail. After that year the practice had been to charge lump sums under the head 'Proportionate Share of Funds'. A levy of a similar kind had been made against the Publication Fund for a number of years. The Committee recommended that a definite policy should be adopted for the future with regard to levies on any of these funds. In the case of those financed from Government Grants levies of about 33% of the annual amounts should be sanctioned as a general policy. With regard to the Publication Fund the Committee recorded its opinion that all sale proceeds and subscriptions to the *Journal* and *Memoirs* should, as originally intended, be credited to the Fund. The amount to be debited to this Fund with regard to the publications of the Society should definitely be for that

purpose only. Any balance not spent on the publication of the *Journal* and *Memoirs* during the year should be re-credited and not absorbed in the general temporary reserve.

The Committee recommended that the Building Fund and the Building Repair Fund be amalgamated; that the interest derived from all the Medal and Prize Funds, as well as the Provident Fund, should be credited to the respective funds and not kept in suspense account; that a Dead Stock Account and a Profit and Loss Account should be maintained; that the present form of the Publication Fund Account should be changed, and in the Personal Account only arrears of subscriptions not realized but which are likely to be realized during the next year should be shown, whilst the amount realized each year, both as Members' subscriptions and as subscriptions to the *Journal* and *Memoirs*, should be credited separately, the former to the general income of the Society and the latter to the Publication Fund. A separate account for each Fund of the Society must be maintained. As the adoption of these recommendations during the currency of the year's accounts would have given rise to certain technical difficulties, they will be given effect to fully from 1940.

The Committee found that the Rules of the Society do not definitely assign the duty of the preparation of the accounts to any particular officer, and it, therefore, recommended that this should devolve on the Honorary Treasurer. It also defined the procedure that should be followed in their preparation.

Appendix III contains the usual statements showing our accounts for 1939. No change has been made in the form of their presentation.

One statement, still carried over, is :

Statement No. 17. International Catalogue of Scientific Literature, London.

The other statements are presented as in the previous year.

As usual the Fund Accounts show the invested assets written down to their market values as at the end of the year and Investment Account No. 24 shows the allocation of invested paper to each fund specifically, whilst both market and face values of the investments are shown.

Statement No. 26 shows the Balance Sheet of the Society and the different funds administered by and through it.

The funds belonging to or administered by the Society may be classified as follows :—

(a) General Fund:—

- (i) Permanent Reserve.
- (ii) Working Balance.

(b) Specific Funds belonging to the Society.

(c) Funds administered by the Society.

At the end of the year, the position of these funds, as compared with their position at the end of 1938, was as follows :—

	Face value.	Market value.	Face value.	Market value.
	31st Dec., 1938.	31st Dec., 1938.	31st Dec., 1939.	31st Dec., 1939.
	Rs.	Rs.	Rs.	Rs.
1. General Fund ..	2,97,700	2,93,000	2,83,000	2,51,000
(a) Permanent Reserve ..	2,54,200	2,49,500	2,54,200	2,22,200
(b) Working Balance ..	43,500	43,500	28,800	28,800
2. Specific Funds belonging to the Society ..	81,000	81,000	74,000	74,000
3. Funds administered by the Society ..	43,800	43,300	45,400	41,200
	4,22,500	4,17,300	4,02,400	3,66,200

During the year Rs.640 were received as admission fees. This amount will be transferred to the Permanent Reserve in the usual manner by conversion of Government paper (3½%) belonging to the Temporary Reserve.

The Government of Bengal maintained the 20% cut in all grants made by them to the Society during the year.

The Society received the following grants from that Government :—

For	Rs.	Statement.
Journals ..	1,600	1
O.P. Fund No. 1 ..	7,200	2
Sanskrit MSS. Fund ..	2,880	4
	11,680	

The Government of Bengal annual grant, of Rs.2,400 for publication of works of historical interest for the year 1938-39, as well as that for 1939-40, was realized.

Owing to the large number of works published during the year, with a resultant heavy outlay on printing, binding and editing fees, Oriental Publication Fund No. 2, (Statement No. 3), closed with a debit balance of Rs.3,144-15-1.

The Government of India grant for Arabic and Persian MSS., (Statement No. 5), was reduced to Rs.2,500 this year. Representations have been made for its restoration to the original sum of Rs.5,000 and it is hoped that these will be successful. As a result of this reduction the Fund was in debt to the extent of Rs.1,417-1-3 at the close of the year.

The income derived from advertising amounted to Rs.9,600.

The temporary investments of funds in Fixed Deposit and Savings Bank are shown in Statement Nos. 22 and 23.

Statement No. 20 gives an account of the amounts due to and by the Society for membership subscriptions, sales of publications and contingent charges.

The Government Securities shown in Statement No. 24 are held in safe custody by the Imperial Bank, Park Street Branch. During the year there was a considerable depreciation of the securities amounting to Rs.29,921-8-0, decreasing to that extent the book assets of the Society.

The budget estimates for 1939 and the actuals of the year were as follows:—

Estimates.			Receipts.	Expenditure.
			Rs.	Rs.
Ordinary	..	..	56,650	56,650
Extraordinary	..	..	650	650
TOTAL			57,300	57,300
Actuals.				
Ordinary	..	..	59,297	63,245
Extraordinary	..	..	448	448
TOTAL			59,745	63,693

The ordinary income was about Rs.2,647 more than the estimate.

The sum of Rs.6,595 was expended above the estimate.

The budget estimates for probable expenditure have as usual been framed to meet demands under various heads based on vigorous activity in all departments of the Society's work.

The receipts have been conservatively estimated.

BUDGET ESTIMATE FOR 1940.

Ordinary Receipts.

	Budget Estimate for 1939.	Actuals for 1939.	Budget Estimate for 1940.
	Rs.	Rs.	Rs.
Interest on Investments and Deposits	{ 10,000 1,000	10,012 1,050	10,000 750
Advertising	9,600	9,650	10,200
Rent	9,900	10,715	10,680
Annual Grant	1,800	1,600	1,600
Miscellaneous	200	260	300
Members' Subscriptions	10,000	8,890	9,000
Publications, Sales and Subscriptions	4,000	7,370	5,000
Proportionate Share of Funds	7,000	7,000	4,500
Indian Science Congress Contribution	600	..	..
Working balance for meeting arrears of Publications	2,750	2,750	..
TOTAL	56,650	59,297	52,030

Ordinary Expenditure.

	Budget Estimate for 1939.	Actuals for 1939.	Budget Estimate for 1940
	Rs.	Rs.	Rs.
Salaries	33,000	27,468	22,500
Commission	300	280	300
Stationery	400	727	550
Fan, Light and Telephone ..	700	660	700
Taxes	2,400	2,388	2,400
Postage	1,200	1,320	1,200
Contingencies	750	767	750
Petty Repairs	150	82	150
Insurance	500	500	500
Menials' Clothing	100	90	200
Office Furniture	500	485	500
Building Repairs	2,000	2,000	2,000
Provident Fund Share	700	701	800
Audit Fee	250	250	250
Books, Library	2,500	2,630	3,000
Binding, Library	500	2,518	1,000
Journal and Memoirs	10,000	8,197	7,000
Printing Circulars	700	980	700
Gratuities .. .. .	..	11,127	..
Contribution .. .. .	..	100	..
TOTAL ..	56,650	63,245	44,500

Extraordinary Receipts.

	Budget Estimate for 1939.	Actuals for 1939.	Budget Estimate for 1940.
	Rs.	Rs.	Rs.
By Fees			
by Admission Fees	650	448	650
by Compounding Fees .. .. .	..	..	..
by Institutional Membership Regis- tration Fees .. .. .	..	..	..
TOTAL ..	650	448	650

Extraordinary Expenditure.

	Rs.	Rs.	Rs.
To Permanent Reserve			
by Admission Fees	650	448	650
by Compounding Fees .. .. .	..	..	..
by Institutional Membership Regis- tration Fees .. .. .	..	..	..
TOTAL ..	650	448	650

Publications.

During the year the complete volume for 1938 (IV) of the *Journal* and *Proceedings* of the Royal Asiatic Society of Bengal consisting of four numbers of Letters and two numbers of Science (794 pages) was issued, as well as the Title page and Index to Vols. II and III. The *Year Books* for 1936 (196 pages), 1937 (138 pages) and 1938 (164 pages) bringing the series up-to-date, also appeared.

The *Proceedings* of the Twenty-fifth (Jubilee) Session of the Indian Science Congress consisting of Parts I-IV and preliminary matter (title pages, contents, etc.) making a total of 1,150 pages and 8 plates were published during the year. A reprint of the *Proceedings* of the Third Indian Science Congress consisting of 70 pages and 2 plates was issued.

With the publication of Part II of the *Proceedings* of the Twenty-sixth Session of the Indian Science Congress (360 pages and 2 plates) which appeared during the year our responsibility for printing further parts of the *Proceedings*, etc. of the Indian Science Congress Association ceased, the Association having taken on itself the complete charge of all of its activities.

During this year, especially the latter half, after the office had been reorganized, a great deal of time and energy was given to clearing up the arrears in the publications of the Society. In the course of the examination by the Special Enquiry Committee it was disclosed that a large number of works intended either for the *Journal* and the *Memoirs* or the *Bibliotheca Indica* Series had been lying in the press for many years in various stages of printing. The Committee prepared a list of these works (Appendix I—Annexures A and B of the Interim Report given in Appendix II) and recommended that immediate steps be taken to publish them. Of the ten items mentioned in Annexure A, which required further consideration, five were intended for the *Journal* and five for the *Bibliotheca Indica* Series. Of these the two papers on 'The Nagas in the III century A.D.' and 'Folklore of the Assamese' were referred again and found to be suitable for publication. They were accordingly sent to the press and will appear in Vol. V of the *Journal*. The article on the Commemoration Inscription and Cult Image of Annanta Vasudeva Temple was withdrawn by the authors and the remaining two papers on 'The Law of Alluvion and Diluvian' and 'Agriculture in Ancient India' were rejected on examination.

Of the works intended for the *Bibliotheca Indica* Series, Mr. Johan van Manen undertook to complete the English translation of *Vajjalagam*. Pandit Kedarnath of Jaipur City has now been entrusted with the task of revising and editing the Sanskrit edition of the *Tīrthakalpa*. He is making satisfactory progress with this work and it is expected that it will be issued in 1940.

Prof. Raghu Vira of Lahore agreed to complete the work on *Vaikhānasaśrautasūtram* of Dr. W. Caland originally undertaken by Mr. Johan van Manen. The index is now ready and the book will soon be issued.

The concluding fascicle of the text of Vol. I of the *Haft Iqlīm* in Persian of Amin Ahmed Razi edited by Mr. A. H. Harley and Khan Bahadur Maulvi Abdul Muqtadir was revised by Prof. Mahfuz-ul Haq and appeared during the year. With its appearance Vol. I of the *Haft Iqlīm* is complete and the rest of the work to be issued in three volumes will be published in due course.

The third volume of the English translation of the *Ṭabaqāt-i-Akbarī* of the Khwāja Nizāmuddīn Ahmed in two parts and consisting of 814 pages appeared during the year. The manuscript of this volume was left by the late Mr. Brojendranath De, M.A., I.C.S. (Retd.). Dr. Baini Prashad, D.Sc., F.R.A.S.B., was invited to edit it and, after very carefully revising and comparing the MSS. with the original and after furnishing an extremely valuable introduction in which the life and work of the author and the importance of the *Ṭabaqāt* in Indian History is critically reviewed, saw the work through the press before the end of the year. With the publication of the index early next year the whole work will be completed.

Of the works mentioned in Annexure B, the following belonging to the *Bibliotheca Indica* Series appeared during the year.

(1) The *Āin-i-Akbarī* of Abu-l-Faẓl 'Allāmī originally translated by H. Blochmann and revised by Lt.-Col. D. C. Phillott, Vol. I, 796 pages, 17 plates and 1 table (a reprint of the second edition).

(2) The English translation of the *Akbarnāma* of Abu-l-Faẓl by H. Beveridge, I.C.S. (Retd.), Vol. III, concluding fascicle of 112 pages.

(3) The Persian text of *Tārīkh-i-Shāhī* of Ahmad Yādgar edited by Khan Bahadur Dr. Hidayat Hosain (complete work in 492 pages).

(4) Illustrated Manuscript of the *Rubā'iyāt* of 'Umar-i-Khayyām edited by Prof. M. Mahfuz-ul Haq (complete work).

(5) The Persian text of the *'Amal-i-Šāliḥ* edited by Prof. G. Yazdani. The concluding fascicle of Vol. III was issued during the year. With the publication of the index, which is in progress now, the whole work will be completed.

(6) Sanskrit text of the *Manu-Smṛti* with the *Manubhāṣya* of Medhātithi, edited by MM. Dr. Ganganath Jha, M.A., D.Litt., LL.D., Vol. I was already published and with the appearance of Vols. II and III this year (604 pages) the work is now complete.

(7). *Saundarananda Kāvya* by Ārya Bhadanta Āśvaghōṣa edited by MM. Dr. Haraprasad Shastri, C.I.E., M.A., D.Litt., and reprinted with additions by Prof. Chintaharan Chakravarti, M.A. (complete work in 202 pages).

(8) *Āmatattvaviveka of Udayanācārya* edited by MM. Vindhyesvariprasada Dvivedin and Pandit Lakshmana Sastri Dravida—the concluding fascicle of 546 pages.

Of the remaining works mentioned in Annexure B the Tibetan work on '*A Lower Ladakhi Version of the Kesar Saga*' is being seen through the press by Mr. Trin Chen and arrangements have been made for the revision and editing of the following works:—

(1) *Kuttanimatam*.—Pandit Madhusudan Kaul Sastri, the original editor of the work has agreed to revise and complete it (subject to the permission of the Kashmir Govt. of which he is an officer). The MSS. has accordingly been recalled from the press in which it has been lying since 1926 and it is hoped that the publication of the work will be possible during 1940.

(2) *Dharmabindu*.—The manuscript has been recalled from the press and entrusted to Prof. Chintaharan Chakravarti, M.A., for revision.

(3) *Avadana Kalpalata*.—Prof. D. C. Chatterjee, M.A., has been entrusted with the task of revising the work and it is expected that it will be published during next year.

(4) *Varṇa Ratnākara*.—Satisfactory progress is being made with this work. The text (with the index) prepared by Dr. S. K. Chatterji and Pandit Babua Misra is ready and after the printing of the English and Maithili Introductions the work will be published.

(5) The Tibetan work *Dowazangmo* was originally prepared by Mr. Karma Paul and arrangements have now been made with other Tibetan scholars to revise and edit the work and see it through the press.

With regard to the papers mentioned in Annexure B and intended for the *Journal* and *Memoirs* of the Society, the following have already been published in Vol. IV of the *Journal* namely:—

- (1) On Tamerlane.
- (2) Chinese connection with Africa.
- (3) Development of the Bengali Alphabet.
- (4) Yano-Daffa Grammar.
- (5) A Vocabulary of Mawkhen Salon, etc.

Steps have been taken to edit and publish the large monograph on the 'Wild Men of Tibet' which has been lying in the press for over a decade. Of the rest, namely the 'Arayankavu Landslip' and 'A new work on Tibetan Grammar', the type has been distributed as the gist of these papers was published elsewhere in the meantime.

The late Dr. P. O. Bodding's Memoir on 'How the Santals Live' required a thorough revision of the Zoological and Botanical

terms used. This has now been accomplished with the help of several scientists and the Memoir is expected to be issued at an early date. •

The Memoir on a revised edition of *Mahāvvyutpatti* (Sanskrit-Tibetan-English Vocabulary) by Alexander Csoma de Körös has been lying incomplete for many decades although all the materials necessary for completing the work were available in the archives of the Society. Arrangements have now been made to revise and complete the work by Mr. Trin Chen and Prof. D. C. Chatterjee under the supervision of Prof. S. K. Chatterji, D.Lit., F.R.A.S.B., the Philological Secretary.

Catalogues.—Volume I of the *Descriptive Catalogue of the Arabic Manuscripts* dealing with the subjects of Qurān, Sunnite Tradition, Biographical Tradition of Muhammad, Shī'ite Tradition, Criticism of Ḥadīthes, and Sūfism, etc. prepared by W. Ivanow and revised and edited by Khan Bahadur Dr. Hidayat Hosain, Ph.D., F.R.A.S.B., has been published during the year.

Volume VIII, Pt. I, of the *Descriptive Catalogue of the Sanskrit Manuscripts* belonging to the Government but housed with the Society and dealing with the subject of Tantra prepared by the late MM. Dr. Haraprasad Shastri, C.I.E., D.Litt., F.A.S.B., and revised and edited by Prof. Chintaharan Chakravarti, M.A., consisting of 608 pages has been issued during the year. Satisfactory progress is being made with Part II of the volume which it is expected will be issued during 1940.

It will be seen from the above records that the number of publications issued during the year is unprecedented in the annals of the Society. All the works mentioned in Annexures A and B of the Interim Report of the Special Enquiry Committee have either been published or where this could not be done immediately effective steps have been taken for their revision and completion so that they can be printed without any unnecessary delay. This tremendous output in the publications of the Society has been made possible by the energetic and loyal co-operation of all members of the Staff. The help given by members of the Special Enquiry Committee must also be acknowledged gratefully. The great service rendered by its Secretary, Dr. Bains Prasad, D.Sc., F.R.A.S.B., needs however special mention as without his help and the labour that he so ungrudgingly gave in the cause of the Society it would have been impossible to accomplish this immense task so successfully.

The following are the works in the *Bibliotheca Indica* Series sanctioned previously in which satisfactory progress has been made during the year:—

- (1) *Doctrine of Nimbārka*: Translations of Nimbārka's and Śrīnivāsa's Commentaries on the Brahma-Sūtras, Vols. I and II.

This up to 320 pages has been printed during the year. It is expected to publish Volume I as early as possible.

- (2) *Lushai-English Dictionary*: This up to 128 pages has been printed during the year. It is expected to publish the work during next year.

A list of new works in the Bibliotheca Indica Series undertaken by the Society during the year is given below :

- (1) *Humāyūn Nāma* or *Qānūn-i-Humāyūnī*, Persian,
- (2) *Tarikh-i-Humāyūn* of *Bāyazīd*, Persian,
- (3) *Bhagawat Gītā* in Persian verse,
- (4) *Maāthir-ul-Umarā*, English Translation.

The last is an old work left incomplete by Mr. H. Beveridge, of which three double fascicles were published (1911-1914). The Council has now requested Dr. Baini Prashad to complete it.

New Improvements.

In dealing with the large arrears in the publications of the Society the Special Enquiry Committee suggested that for more expeditiously dealing with, for better adjudication and improvement of the general standard of our publications, and for ensuring greater regularity in their appearance:—

- (a) the existing Publication Committee should be reconstituted with additional Secretaries for Archæology and Philosophy;
- (b) that it should meet at least a week before the meeting of the Council;
- (c) that there should be a Special Bibliotheca Indica Committee to deal with all publications intended for that Series;
- (d) that a new Section be added to our Journal for publishing reviews of important works on literature and science received for that purpose; and
- (e) that the official proceedings should be issued as advance proceedings after each Ordinary Monthly Meeting.

These recommendations were accepted by the Council and steps have been taken to give effect to them.

The Baptist Mission Press.

Under Mr. P. Knight's most capable superintendence, and ably assisted by Messrs. Norman A. Ellis and G. E. Bingham, the Baptist Mission Press continued to render the Society excellent service with regard to its printed work. The year was

one of intense activity in respect of publications and the Society is greatly indebted to the Press for the splendid manner in which it co-operated and dealt with the many calls made upon it.

Other Presses.

During the year two works *Āin-i-Akbari*, Vol. I, Blochmann's translation, and the *Manu-Smṛti*, Vols. II and III (Index of Verses), were completed through the agency of Messrs. Stephen Austin & Sons, Ltd., Hertford, and the Indian Press, Ltd., Allahabad, respectively. The estimates for these two works were accepted many years ago. As a matter of general principle the Council is of opinion that all printing work should ordinarily be carried out in Calcutta and should not be given to outside presses, thus avoiding considerable delay and unnecessary additional expenditure in respect of freight charges, insurance, etc.

Agencies.

Our European, American and Indian Agents remained the same throughout the year. An extension of the list for Asiatic countries is desirable.

Exchange of Publications.

During the year, the following applications for exchanges with the Society's publications were considered by the Council, and its decisions are noted against each of them :—

<i>Publications of :</i>	<i>To be exchanged with :</i>
Journal of Indian History, Madras ..	Journal.
Science Museum, London ..	Memoirs.
Jaina Siddhanta Bhaskara, Arrah ..	Journal.
State Public Library, Leningrad ..	Journal and Memoirs.
Afghan Academy, Kabul ..	Journal and Memoirs.
Stanford University, California, U.S.A.	Journal.
Oriental Publication Bureau and Dairat-ul-Maarif Press, Hyderabad, Deccan	Arabic and Persian works of Bibliotheca Indica Series.
Entomological Society of India ..	Journal.
National Library of Peiping, China ..	Journal.
Shibli Academy, Azamgarh ..	Arabic and Persian works of Bibliotheca Indica Series.
Annals of Oriental Research, University of Madras ..	Bibliotheca Indica.

Meetings.

The Ordinary Monthly Meetings of the Society were held regularly every month, with the exception of the recess month of October. The recorded average attendance was 13 members and 3 visitors. The maximum attendance was in July with 21 members and 5 visitors.

No meetings of the Medical Section were held during the year.

Exhibits.

At the Ordinary Monthly Meetings a number of exhibits were shown and commented upon by the exhibitors. The following may be mentioned :—

- A. M. Heron: Mica with inclusions.
- Chintaharan Chakravarti: MS. of a Tantra work on the cult of Pañcāṇa.
- S. L. Hora: Two new Exhibits in the Fish Gallery of the Indian Museum.
- Eileen W. E. Macfarlane: Marriage Symbols from the West Coast of India.
- B. S. Guha: 'Simphak'—The Bark Cloth of the Garos of Assam and a photograph of the late Rev. Fr. H. Hosten, S.J.
- H. S. Rao: The King Crab.
- Sir David Ezra: A Chameleon.
- M. Hidayat Hosain: Humāyūn Nāma.
- Jhr. P. J. Eekhout: A Tibetan Banner.

Communications.

Apart from papers submitted both for reading and subsequent publication a number of communications, not intended for subsequent publication, were made from time to time in the Ordinary Monthly Meetings.

Amongst such communications the following may be mentioned :—

- Chintaharan Chakravarti: Society's collection of MSS. of works on the Science of Warfare in old India; A Tantric Story about the origin of Vijayanagar; and Sanskrit works of Sāhib Kaula.
- K. Biswas: The Rôle of the Common Algal Communities of the River Hooghly on the Drinking Water of Calcutta.
- B. Prashad: A historical Note about the Indo-Brahm or the Siwalik River and an Old Letter from James Prinsep.
- R. R. Mookerji: Two combined Pottery and Basketry Specimens from Upper Assam.
- Major H. Hobbs: J. A. Hicky 'Bengal Gazette—1780-82'.
- S. L. Hora: Observations on the Abundance of Hilsa Crop this year.

Philology.

Twelve papers read in previous years were published.

History.

Three papers read in previous years were published.

Five papers were read and published.

Three papers were read and will be published later.

Natural History : Biology.

One paper read in the previous year was published.

One paper was read and published.

Four papers were read and will be published later.

Anthropology.

Two papers read in previous years were published.

One paper was read and published.

Two papers were read and will be published later.

Archæology.

Two papers read in the previous years were published.

Increase of Cultural Activities.

The Special Enquiry Committee considered the question of the possible increase of cultural activities, and came to the conclusion that this could be effected in the following ways :—

For some time past no general lectures have been delivered. A series of these should be arranged to be given by distinguished scholars every year, and a provision of Rs.500 per annum should be made in the budget for this purpose. When funds are available from special endowment funds the question of instituting special lectureships should be considered.

The Committee also drew attention to the unique position which the Society holds in the world of culture and suggested that constant consideration should be given to the steps necessary to keep it in touch with bodies having similar objects and activities. This is all the more necessary owing to the number of learned societies which have been formed in recent years. One way in which the Society can achieve this object is to arrange periodically for joint meetings, discussions and conferences, under its auspices, with other learned societies.

Desiderata.

The year has seen many improvements in various directions effected, or put into the way of becoming effective. These have been reported on in the foregoing items. To fulfil adequately the aims and objects of the Society much remains to be done and there must be a continuance of that same devoted service, co-operation and assistance, which have been such marked characteristics of this venerable institution throughout its long career. Our building is an old one, it was completed in 1808, and will not last for ever. Our possessions are numerous, valuable, and in many cases old and unique. They require that

constant care and attention which must be of the best that can be procured. The question of providing an air-conditioned room for our most valuable and rare treasures, particularly MSS. and books, was considered by the Special Enquiry Committee, but had to be shelved for the present owing to the financial position of the Society. The income from our investments is far too small and every effort must be made to increase our permanent reserve. The amount available annually for the purchase of books for the Library is comparatively little, and we need a vastly increased Permanent Library Endowment Fund to cope with our needs for new accessions and proper care, binding and preservation of our existing books. Money is needed for the establishment of special lectureships and for general lectures.

The Council, therefore, whilst finishing this report with a note drawing attention to the most pressing of the Society's requirements, does so in the assured hope that it will not fail to receive the same ready response from the Society's members and well-wishers as it has invariably in the past.

[APPENDIX I.]

Membership Statistics.

(As calculated for December 31st, for 30 years.)

YEAR.	ORDINARY.								EXTRA-ORDINARY.					FELLOWS.		
	PAYING.				NON-PAYING.			Total Ordinary Members.						Grand Total Membership.		
	Resident.	Non-Resident.	Foreign.	Total.	Absent.	Life.	Total.		Centenary Honorary.	Associate.	Institutional.	Anniversary Honorary.	Total.			
1910 ..	209	217	16	442	43	23	66	508	4	14	..	..	18	526	27	17
1911 ..	200	225	19	444	53	22	75	519	3	14	..	..	17	536	28	19
1912 ..	203	229	19	451	43	23	66	517	3	13	..	..	16	533	27	24
1913 ..	200	211	19	430	46	23	69	499	3	14	..	..	17	516	27	28
1914 ..	191	187	19	397	50	26	76	473	3	14	..	..	17	490	24	27
1915 ..	171	188	21	380	40	25	65	445	3	15	..	..	18	463	29	31
1916 ..	145	159	18	322	60	25	85	407	3	15	..	..	18	425	26	33
1917 ..	150	144	15	309	45	24	69	378	2	12	..	..	14	392	22	35
1918 ..	153	145	17	315	43	24	67	382	2	10	..	..	12	394	22	39
1919 ..	141	128	15	284	64	25	89	373	2	11	..	..	13	386	18	36
1920 ..	161	134	15	310	32	26	58	368	2	11	..	..	13	381	28	38
1921 ..	160	132	16	308	26	26	51	359	2	12	..	..	14	373	28	40
1922 ..	160	141	16	317	26	26	52	369	2	13	..	..	15	384	30	39
1923 ..	147	120	13	280	30	27	57	337	2	11	..	..	13	350	28	37
1924 ..	209	134	12	355	29	28	57	412	2	12	..	..	14	426	27	37
1925 ..	263	137	12	412	23	27	50	462	2	12	..	..	14	476	26	34
1926 ..	319	162	20	501	23	28	51	552	2	12	..	..	14	566	25	34
1927 ..	328	167	18	513	28	33	61	574	2	13	..	..	15	589	28	38
1928 ..	344	167	23	534	42	46	88	622	1	12	..	..	13	635	28	40
1929 ..	331	181	21	533	36	49	85	618	1	10	2	..	13	631	27	43
1930 ..	291	194	37	522	22	52	74	596	1	8	2	..	11	607	29	47
1931 ..	228	184	29	441	26	52	78	519	1	8	5	..	14	533	29	46
1932 ..	222	126	23	371	27	54	81	452	1	7	5	..	13	465	28	45
1933 ..	194	126	27	347	33	56	89	436	..	7	6	..	13	449	26	49
1934 ..	217	112	30	359	26	57	83	442	..	6	7	12	25	467	26	47
1935 ..	206	107	28	341	28	56	84	425	..	5	7	11	23	448	24	44
1936 ..	214	106	24	344	16	55	71	415	..	5	10	11	26	441	21	46
1937 ..	205	99	29	333	20	55	75	408	..	5	12	10	27	435	19	49
1938 ..	193	98	21	312	24	54	78	390	..	4	12	10	26	416	19	45
1939 ..	187	103	21	311	21	54	75	386	..	6	12	10	28	414	22	46

[APPENDIX II.]

Publications for re-consideration by the Publication Committee.

ANNEXURE A.

Bib. Ind. English—

1. Vajjalagam.
2. Tabaqat-i-Akbari, Vol. III.

Bib. Ind. Persian—

1. Haft Iqlim.

Bib. Ind. Sanskrit—

1. Tirthakalpa.
2. Vaikhanasasrautasutram.

Journal—

1. The Nagas in the III and IV Century A.D.
2. Folklore of the Assamese.
3. The Law of Alluvion and Diluvian.
4. Agriculture in Ancient India.
5. The Commemoration Inscription and Cult Image of Annanta Vasudeva Temple.

ANNEXURE B.

I. *Bib. Ind. English—*

1. Akbarnama.
2. Kesar Saga.
3. Ain-i-Akbari, Vol. I.

II. *Bib. Ind. Persian—*

1. Shahjahan Nama.
2. Tarikh Salatin Afaghina.
3. Rubaiyat of Umar-i-Khayyam.

III. *Bib. Ind. Sanskrit—*

1. Kuttaninatam.
2. Dharmabindu.
3. Avadana Kalpalata.
4. Atmatattvaviveka.
5. Saundarananda Kavya.
6. Varna Ratnakara.

IV. *Bib. Ind. Tibetan—*

1. Dowazangmo.

V. *Shams-ul-Ulama Hidayat Hosain : Arabic MSS. Catalogue*

1. 66 pages of page proof.
2. 144 notices for Vol. I.
3. Index to Vol. I.

VI. *Mr. C. Chakravarti : Sanskrit Catalogue, Vol. VIII to be completed.*

VII. *Proceedings 3rd Indian Science Congress. Reprint.*

VIII. *Year Books for 1936, 1937 and 1938.*

IX. *Journal—*

1. Wild Men of Tibet.
2. On Tamerlane.
3. The Aryankavu Landslip.
4. Chinese Connection with Africa.
5. A New Work on Tibetan Grammar.
6. A Vocabulary of Mawkhen Salon, etc.
7. Development of Bengali Alphabet.
8. Yano-Dafla Grammar.

X. *Memoirs.*

1. How the Santals Live.
 2. Completion of the revised edition of *Mahavyutpatti*—Sanskrit-Tibetan-English Vocabulary—by Alexander Csoma de Körös, in Vol. IV of the *Memoirs*.
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[APPENDIX IIA.]

List of Publications issued by the Royal Asiatic Society of Bengal during 1939.**(a) Bibliotheca Indica :**

	Price.
	Rs. As. P.
<i>I. Sanskrit Works :</i>	
(1) Saundarananda Kāvya (Reprint), complete work (3 units)	3 0 0
(2) Atmatattvaviveka, Fasc. 6, concluding fascicle, (6 units)	4 8 0
(3) Manu-Smṛti, Volume II (5 units)	5 0 0
(4) Manu-Smṛti, Volume III (2 units)	2 0 0
<i>II. Arabic and Persian Works :</i>	
(5) Tārīkh-i-Shāhī, complete work (5 units)	5 0 0
(6) Ṭabaqāt-i-Akbarī, English Trans., Vol. III, Part I (5 units)	6 4 0
(7) Ṭabaqāt-i-Akbarī, English Trans., Vol. III, Part II (4 units)	5 0 0
(8) Akbarnāma, English Trans., Vol. III, Fasc. 14, concluding fascicle (2 units)	2 8 0
(9) Āin-i-Akbarī, English Trans. (Reprint), Volume I (26 units)	25 0 0
(10) Rubā'iyāt of 'Umar-i-Khayyām, complete work (59 units)	20 0 0
(11) Haft-Iqlīm, Volume I, Fasc. 3, concluding fascicle (2 units)	2 8 0
(12) 'Amal-i-Ṣāliḥ, Volume III, Fasc. 5, concluding fascicle (2 units)	2 0 0

(b) Journal and Proceedings (Third Series):

Vol. III Year-Book for 1936 (13 units)	4 14 0
„ IV Letters No. 1 .. (10 units)	3 12 0
„ „ „ No. 2 .. (10 units)	3 12 0
„ „ „ No. 3 .. (11 units)	4 2 0
„ „ „ No. 4 .. (20 units)	7 8 0
„ „ Science No. 1 .. (1 unit)	0 6 0
„ „ „ No. 2 .. (6 units)	2 4 0
„ „ Year-Book for 1937 (9 units)	3 6 0
„ V Year-Book for 1938 (11 units)	4 2 0

Title-page and Index to Volumes II and III (Free to members).

(c) Miscellaneous :

(1) Descriptive Catalogue of Arabic Manuscripts in the collection of the Royal Asiatic Society of Bengal, Volume I	10 0 0
(2) Descriptive Catalogue of Sanskrit Manuscripts in the collection of the Royal Asiatic Society of Bengal, Volume VIII, Tantra, Part I	8 12 0
(3) Proceedings of the 25th Indian Science Congress Main Volume (Parts I to IV combined)	30 0 0
(4) Proceedings of the 26th Indian Science Congress, Part II, Presidential Addresses	9 6 0
(5) Proceedings of the 3rd Indian Science Congress, Reprint edition	2 10 0

Abstract Statement
of
Receipts and Disbursements
of the
Royal Asiatic Society of Bengal
for
the Year 1939

STATEMENT No. 1.

1939.

General

Income and Expenditure Account

		Rs.	As.	P.	Rs.	As.	P.
TO ESTABLISHMENT :							
Salaries and Allowances	..	27,534	1	0			
Commission	..	299	4	6			
					27,833	5	6
GENERAL EXPENDITURE :							
Stationery ..	..	680	7	0			
Fans and Light	..	366	9	6			
Telephone ..	..	281	7	0			
Taxes ..	..	2,387	5	0			
Postage ..	..	1,385	14	3			
Contingencies	..	850	7	0			
Printing Circulars, etc.	..	1,020	2	0			
Audit Fee ..	..	250	0	0			
Petty Repairs	..	62	12	0			
Insurance ..	..	500	0	0			
Menials' Clothing	..	89	14	0			
Furniture ..	..	500	12	0			
Interest on Security Deposit	..	5	0	0			
					8,380	9	9
GRATUITIES ..	..	....			11,127	0	0
LIBRARY AND COLLECTIONS :							
Books ..	..	2,595	7	6			
Binding ..	..	2,238	10	0			
					4,834	1	6
STEEL SHELIVING ..	..	....			5,980	0	0
PUBLICATIONS :							
Journal and Proceedings	..	....			6,990	6	6
CONTRIBUTION :							
Provident Fund for 1939	..	701	1	9			
R.A.S. China	..	100	0	0			
					801	1	9
					65,946	9	0
TRANSFER TO—							
Building Repair Fund Account	..	....			2,000	0	0
SUNDRY ADJUSTMENTS :							
Bad debts written off ..	..	1,190	2	0			
Depreciation, Investments revalued on 31st December, 1939	..	29,921	8	0			
					31,111	10	0
BALANCE AS PER BALANCE SHEET ..		....			2,50,988	6	6
					3,50,046	9	6

STATEMENT No. 1.

Fund.

1939.

for the year to 31st December, 1939.

		Rs.	As.	P.	Rs.	As.	P.
By BALANCE FROM LAST ACCOUNT	..	....			2,93,175	8	4
CASH RECEIPTS:							
Interest on Investments	..	10,012	0	0			
Interest on Fixed Deposits	..	1,950	0	0			
Advertising	..	9,600	0	0			
Miscellaneous	..	253	10	3			
Government Grant	..	1,600	0	0			
Rent	..	10,650	0	0			
					33,165	10	3
PERSONAL ACCOUNT:							
Members' Subscriptions	..	9,389	0	0			
Admission Fees	..	640	0	0			
Publications	..	6,676	6	11			
					16,705	6	11
TRANSFER FROM FUNDS:							
Proportionate Share in General							
Expenditure—							
Oriental Pub. Fund (1) Account		2,500	0	0			
Sanskrit MSS. Fund Account	..	2,000	0	0			
Arabic and Persian MSS. Fund							
Account	..	2,500	0	0			
					7,000	0	0

3,50,046 9 6

STATEMENT No. 2.

1939.

Oriental Publication

From a monthly grant made by the Government of Bengal for the
Languages (Rs. 500), and for the publication
(Less 20% from the

	Rs.	As.	P.
Editing	103	8	0
To Printing	394	6	0
Proportionate Share in General Expenditure ..	2,500	0	0
Balance as per Balance Sheet	16,768	7	2
	<hr/>		
	19,766	5	2

STATEMENT No. 3.

1939.

Oriental Publication

From an annual grant made by the Government of Bengal of
Historical
(Less 20% from the

	Rs.	As.	P.
To Printing	8,571	10	9
Editing	1,118	11	9
Binding	399	6	0
	<hr/>		
	10,089	12	6

STATEMENT No. 4.

1939.

Sanskrit Manuscripts Fund

From an annual grant of Rs. 3,200 made by the Government of Bengal
by the Society ; and Rs. 3,600 from the
(Less 20% from the

	Rs.	As.	P.
To Cataloguing	1,200	0	0
Proportionate Share in General Expenditure ..	2,000	0	0
Purchase of books	21	8	0
Binding	1	8	0
Balance as per Balance Sheet	24,824	1	3
	<hr/>		
	28,047	1	3

STATEMENT No. 2.*Fund No. 1, in Account with R.A.S.B.***1939.**

publication of Oriental Works and Works of Instruction in Eastern of Sanskrit Works hitherto unpublished (Rs. 250).
1st of April, 1932.)

			Rs.	As.	P.
By Balance from last Account	..	..	12,566	5	2
Annual Grant	..	..	7,200	0	0
			19,766	5	2

STATEMENT No. 3.*Fund No. 2, in Account with R.A.S.B.***1939.**

Rs. 3,000 for the publication of Arabic and Persian Works of Interest.
1st of April, 1932.)

			Rs.	As.	P.
By Balance from last Account	..	..	2,144	13	5
Annual Grant	..	..	4,800	0	0
Balance as per Balance Sheet	..	..	3,144	15	1
			10,089	12	6

STATEMENT No. 4.*Account, in Account with R.A.S.B.***1939.**

for the publication of the Catalogue of Sanskrit Manuscripts acquired same Government for Research Work.
1st of April, 1932.)

			Rs.	As.	P.
By Balance from last Account	..	..	25,167	1	3
Annual Grant	..	..	2,880	0	0
			28,047	1	3

STATEMENT No. 5.**1939.****Arabic and Persian Manuscripts**

From an annual grant of Rs. 5,000 made by the Government of India for
by the Society; for the purchase of further Manuscripts,
Manuscripts found in

(Reduced to Rs. 2,500)

	Rs.	As.	P.	Rs.	As.	P.
To Purchase of Manuscripts	10	0	0			
Binding	182	4	0			
Cataloguing	2,400	0	0			
Reference Works	100	13	6			
	<hr/>			2,693	1	6
Proportionate Share in General Expenditure .. ..	....			2,500	0	0
				<hr/>		
				5,193	1	6

STATEMENT No. 6.**1939.****Barclay Memorial**

From a sum of Rs. 500 odd given in 1896 by the Surgeon
encouragement of Medical

	Rs.	As.	P.	Rs.	As.	P.
To Depreciation, Investments revalued on 31-12-39 .. ..	....			73	8	0
Balance as per Balance Sheet— Rs. 700, 3½% G.P. Notes, 1854-55..	613	6	0			
Surplus at date	72	4	8			
	<hr/>			685	10	8
				<hr/>		
				759	2	8

STATEMENT No. 7.**1939.****Servants' Pension Fund**

Founded in 1876 as the Piddington Fund

	Rs.	As.	P.	Rs.	As.	P.
To Pension .. ..	....			132	0	0
Depreciation, Investments revalued on 31-12-39 .. ..	....			315	0	0
Balance as per Balance Sheet— Rs. 3,000, 3½% G.P. Notes, 1854-55	2,628	12	0			
Surplus at date	865	6	8			
	<hr/>			3,494	2	8
				<hr/>		
				3,941	2	8

STATEMENT No. 5.

Fund Account, in Account with R.A.S.B.

1939.

the Cataloguing and Binding of Arabic and Persian Manuscripts, acquired and for the preparation of notices of Arabic and Persian various Libraries in India.

for the year 1939-40.)

		Rs.	As.	P.	Rs.	As.	P.
By Balance from last Account			1,276	0	3
Government Grant for 1939-40			2,500	0	0
Balance as per Balance Sheet			1,417	1	3
					<hr/>		
					5,193	1	6

STATEMENT No. 6.

Fund Account, in Account with R.A.S.B.

1939.

General, I.M.S., for the foundation of a medal for the and Biological Science.

		Rs.	As.	P.	Rs.	As.	P.
By Balance from last Account			734	14	8
Interest realized for the year			24	4	0
					<hr/>		
					759	2	8

STATEMENT No. 7.

Account, in Account with R.A.S.B.

1939.

with Rs. 500 odd from the Piddington Fund.

		Rs.	As.	P.	Rs.	As.	P.
By Balance from last Account			3,836	6	8
Interest realized for the year			104	12	0

3,941 2 8

STATEMENT No. 8.

1939.

Annandale Memorial Fund

From donations by subscription,

	Rs.	As.	P.	Rs.	As.	P.
To Depreciation, Investments revalued on 31-12-39 .. ..	....			420	0	0
Balance as per Balance Sheet—						
Rs. 4,000, 3½% G.P. Notes, 1854-55	3,505	0	0			
Surplus at date	707	4	9			
				<hr/>		
				4,212	4	9
				<hr/>		
				4,632	4	9
				<hr/>		

STATEMENT No. 9.

1939

Permanent Library Endowment

From gifts received,

	Rs.	As.	P.	Rs.	As.	P.
To Depreciation, Investments revalued on 31-12-39 .. ..	....			1,470	0	0
Balance as per Balance Sheet—						
Rs. 14,000, 3½% G.P. Notes, 1854-55	12,267	8	0			
Surplus at date	2,228	7	8			
				<hr/>		
				14,495	15	8
				<hr/>		
				15,965	15	8
				<hr/>		

STATEMENT No. 10.

1939.

Sir William Jones Memorial

From a sum gifted for the purpose in

	Rs.	As.	P.	Rs.	As.	P.
To Depreciation, Investments revalued on 31-12-39 .. ..	....			315	0	0
Balance as per Balance Sheet—						
Rs. 3,000, 3½% G.P. Notes, 1854-55	2,628	12	0			
Surplus at date	149	3	0			
				<hr/>		
				2,777	15	0
				<hr/>		
				3,092	15	0
				<hr/>		

STATEMENT No. 8.

Account, in Account with R.A.S.B.

1939.

started in 1926.

		Rs.	As.	P.	Rs.	As.	P.
By Balance from last Account			4,493	12	9
Interest realized for the year			138	8	0

 4,632 4 9

STATEMENT No. 9.

Fund Account, in Account with R.A.S.B.

1939.

started in 1926.

		Rs.	As.	P.	Rs.	As.	P.
By Balance from last Account			15,376	15	8
Interest realized for the year			489	0	0
Donation received during the year			100	0	0

 15,965 15 8

STATEMENT No. 10.

Fund Account, in Account with R.A.S.B.

1939.

1926, by Dr. U. N. Brahmachari.

		Rs.	As.	P.	Rs.	As.	P.
By Balance from last Account			2,988	3	0
Interest realized for the year			104	12	0

3,092 15 0

STATEMENT No. 11.

1939.

Pramathanath Bose Memorial

From a sum gifted for

	Rs.	As.	P.	Rs.	As.	P.
To Depreciation, Investments revalued on 31-12-39 .. ..	....			189	0	0
Balance as per Balance Sheet—						
Rs. 800, 3½% G.P.N., 1842-43 } ..	1,577	4	0			
„ 1,000, „ „ 1865 } ..						
Surplus at date	261	¾	0			
				1,838	7	0
				2,027	7	0

STATEMENT No. 12.

1939.

Joy Gobind Law Memorial

From a donation for the purpose

	Rs.	As.	P.	Rs.	As.	P.
To Cost of a Medal .. ..	....			297	0	0
Depreciation, Investments revalued on 31-12-39 .. ..	....			315	0	0
Balance as per Balance Sheet—						
Rs. 3,000, 3½% G.P. Notes, 1854-55	2,628	12	0			
Surplus at date	104	4	0			
				2,733	0	0
				3,345	0	0

STATEMENT No. 13.

1939.

*Building Fund*From a sum of Rs. 40,000 given by the Government of India
proceeds of a portion

	Rs.	As.	P.
To Balance as per Balance Sheet	6,321	9	6
	6,321	9	6

STATEMENT No. 11.*Fund Account, in Account with R.A.S.B.***1939.**

the purpose in 1935.

		Rs.	As.	P.	Rs.	As.	P.
By Balance from last Account			1,975	3	0
Interest realized for the year			52	4	0

2,027 7 0

STATEMENT No. 12.*Fund Account, in Account with R.A.S.B.***1939.**

in 1929, by Dr. Satya Churn Law.

		Rs.	As.	P.	Rs.	As.	P.
By Balance from last Account			3,240	4	0
Interest realized for the year			104	12	0

3,345 0 0

STATEMENT No. 13.*Account, in Account with R.A.S.B.***1939.**

towards the rebuilding of the Society's premises, and from the sale of the Society's land.

			Rs.	As.	P.
By Balance from last Account	..	..	6,321	9	6
			6,321	9	6

STATEMENT No. 14.

1939.

Calcutta Science Congress Prize

	Rs. As. P.	Rs. As. P.
To Depreciation, Investments revalued on 31-12-39 .. .. .	....	315 0 0
Balance as per Balance Sheet—		
Rs. 3,000, 3½% G.P. Notes, 1854-55	2,628 12 0	
Surplus at date	1,082 14 7	
		<u>3,711 10 7</u>
		<u>4,026 10 7</u>

STATEMENT No. 15.

1939.

Dr. Brühl Memorial Fund

From a sum gifted for the purpose in

	Rs. As. P.	Rs. As. P.
To Cost of a Medal .. .. .	....	9 9 0
Depreciation, Investments revalued on 31-12-39 .. .. .	....	105 0 0
Balance as per Balance Sheet—		
Rs. 1,000, 3½% G.P. Notes, 1854-55	876 4 0	
Surplus at date	116 11 0	
		<u>992 15 0</u>
		<u>1,107 8 0</u>

STATEMENT No. 16.

1939.

Building Repair Fund

	Rs. As. P.
To Building Repairs	5,983 10 0
Balance as per Balance Sheet	5,995 9 6
	<u>11,979 3 6</u>

STATEMENT No. 14.

Fund Account, in Account with R.A.S.B.

1939.

		Rs.	As.	P.	Rs.	As.	P.
By Balance from last Account			3,921	14	7
Interest realized for the year			104	12	0

 4,026 10 7

STATEMENT No. 15.

Account, in Account with R.A.S.B.

1939.

1929, by the Brühl Farewell Committee.

		Rs.	As.	P.	Rs.	As.	P.
By Balance from last Account			1,072	12	0
Interest realized for the year			34	12	0

 1,107 8 0

STATEMENT No. 16.

Account, in Account with R.A.S.B.

1939.

			Rs.	As.	P.
By Balance from last Account	..	..	9,979	3	6
Transfer from R.A.S.B. General Fund	..	..	2,000	0	0
			11,979	3	6

STATEMENT No. 17.

1939.

International Catalogue of Scien-

			Rs.	As.	P.
To Balance as per Balance Sheet	..	..	4,374	7	8
			4,374	7	8

STATEMENT No. 18.

1939.

Provident Fund

From contributions by the

	Rs.	As.	P.	Rs.	As.	P.
To Depreciation, Investments revalued on 31-12-39	90	10	0
Payments during the year	4,552	0	8
Cost of a stamp	0	1	0
Balance as per Balance Sheet—						
Rs. 5,000, 3% G.P. Notes, 1941	5,046	14	0	
.. 6,000, Fixed Deposit, Imperial Bank of India	6,000	0	0	
Savings Bank and Advances	3,283	8	11	
				14,330	6	11
				18,973	2	7

STATEMENT No. 19.

1939

Advances

			Rs.	As.	P.
To Balance from last Account	..	..	660	0	0
Payments during the year	..	..	2,150	0	0
			2,810	0	0

STATEMENT No. 17.

tific Literature, in Account with R.A.S.B.

1939.

			Rs.	As.	P.
By Balance from last Account	..	..	4,374	7	8
			4,374	7	8

STATEMENT No. 18.

Account, in Account with R.A.S.B.

1939.

Society and its Staff.

			Rs.	As.	P.	Rs.	As.	P.
By Balance from last Account	..	....				17,328	4	4
Interest realized during the year	..	49	7	9				
Staff Contribution for the year	..	701	1	9				
Society's Contribution for the year	..	701	1	9				
						1,451	11	3
Interest realized from Savings Bank		....				193	3	0
						18,973	2	7

STATEMENT No. 19.

Account, in Account with R.A.S.B.

1939.

			Rs.	As.	P.
By Refunds during the year	..	..	915	0	0
Balance as per Balance Sheet	..	..	1,895	0	0
			2,810	0	0

STATEMENT No. 20.

1939.

Personal

	Rs.	As.	P.	Rs.	As.	P.
To Balance from last Account ..	....			5,230	5	6
Advances .. ..	....			13,374	8	11
Asiatic Society's Subscriptions, etc. 10,029	0	0				
Book Sales, etc.	6,676	6	11			
				16,705	6	11

 35,319 5 4

STATEMENT No. 21.

1939.

Publication Fund

From sale proceeds

	Rs.	As.	P.
To Books returned, etc.	127	1	0
Balance as per Balance Sheet ..	7,824	8	6
	7,951	9	6

STATEMENT No. 20.

Account.

1939.

		Rs.	As.	P.		Rs.	As.	P.
By Cash Receipts during the year				30,149	4	7
Books returned				127	1	0
Bad Debts written off R.A.S.B.				1,190	2	0
Balance as per Balance Sheet				3,852	13	9

Outstandings.	Amount due to the Society.			Amount due by the Society.		
	Rs.	As.	P.	Rs.	As.	P.
Members	3,632	4	0	750	5	0
Subscribers, etc.	99	0	0	24	0	0
Bill Collector's Deposit ...	...	...	...	100	0	0
Miscellaneous ...	1,284	15	9	289	1	0
	5,016	3	9	1,163	6	0

 35,319 5 4

STATEMENT No. 21.

Account, in Account with R.A.S.B.

1939.

of publications.

		Rs.	As.	P.
By Balance from last Account	..	7,492	6	9
Cash Sale of Publications	..	459	2	9
		7,951	9	6

STATEMENT No. 22.

1939.

(1) *Deposit Account (Savings Bank*

	Rs. As. P.	Rs. As. P.
To Balance from last Account ..	....	5,522 14 4
Deposits of Interest realized from loans during the year ..	49 7 9	
Deposits of Contributions during the year	1,402 3 6	
Deposits of Advances returned ..	915 0 0	
	<hr/>	2,366 11 3
Interest for the year 1939 ..	....	193 3 0
		<hr/>
		8,082 12 7

STATEMENT No. 23.

1939.

(2) *Deposit Account (Fixed Deposit*

	Rs. As. P.
To Balance from last Account	70,000 0 0
	<hr/>
	70,000 0 0

STATEMENT No. 22.*Deposit with Imperial Bank of India).***1939.**

	Rs.	As.	P.	Rs.	As.	P.
By Withdrawal for Staff Advances, etc.			6,702	0	8
Cost of a stamp			0	1	0
Balance as per Balance Sheet			1,380	10	11

8,082 12 7

STATEMENT No. 23.*with Imperial Bank of India).***1939.**

			Rs.	As.	P.
By Withdrawal during the year .. ..	..	..	20,000	0	0
Balance as per Balance Sheet .. ..	..	..	50,000	0	0
			<hr/>		
			70,000	0	0

STATEMENT No. 24.

1939.

(3) Investment

Rs. As. P.

To Balance from last Account 3,24,591 14 0

3,24,591 14 0

Face Value Rs.	FUNDS.	Rate @ Rs. %	31st December, 1939, Valuation.		31st December, 1938, Valuation.		Depreciation.	
			Rs.	A. P.	Rs.	A. P.	Rs.	A. P.
ROYAL ASIATIC SOCIETY OF BENGAL.								
PERMANENT RESERVE.								
16,700	3½% G.P. Notes, 1842-43	}						
1,53,700	3½% G.P. Notes, 1854-55							
44,300	3½% G.P. Notes, 1865 ...							
6,000	3½% G.P. Notes, 1879 ...							
33,000	3½% G.P. Notes, 1900-01							
2,53,700		87/10/-	2,22,304	10 0	2,48,943	2 0	26,638	8 0
500	3% G.P. Notes, 1896-97	75/12/-	578	12 0	439	6 0	60	10 0
TEMPORARY RESERVE.								
18,000	3½% G.P. Notes, 1900-01 ...	87/10/-	15,772	8 0	17,662	8 0	1,890	0 0
11,400	4½% Loan, 1955-60 ...	107/1/-	12,205	2 0	13,537	8 0	1,332	6 0
BARCLAY MEMORIAL FUND.								
700	3½% G.P. Notes, 1854-55 ...	87/10/-	613	6 0	686	14 0	73	8 0
SERVANTS' PENSION FUND.								
3,000	3½% G.P. Notes, 1854-55 ...	87/10/-	2,628	12 0	2,943	12 0	315	0 0
ANNANDALE MEMORIAL FUND.								
4,000	3½% G.P. Notes, 1854-55 ...	87/10/-	3,505	0 0	3,925	0 0	420	0 0
PERMANENT LIBRARY ENDOWMENT FUND.								
14,000	3½% G.P. Notes, 1854-55 ...	87/10/-	12,267	8 0	13,737	8 0	1,470	0 0
SIR WILLIAM JONES MEMORIAL FUND.								
3,000	3½% G.P. Notes, 1854-55 ...	87/10/-	2,628	12 0	2,943	12 0	315	0 0
PRAMATHANATH BOSE MEMORIAL FUND.								
800	3½% G.P. Notes, 1842-43	87/10/-	1,577	4 0	1,766	4 0	189	0 0
1,000	3½% G.P. Notes, 1865							
JOY GOBIND LAW MEMORIAL FUND.								
3,000	3½% G.P. Notes, 1854-55 ...	87/10/-	2,628	12 0	2,943	12 0	315	0 0
CALCUTTA SCIENCE CONGRESS PRIZE FUND.								
3,000	3½% G.P. Notes, 1854-55 ...	87/10/-	2,628	12 0	2,943	12 0	315	0 0
DR. BRÜHL MEMORIAL FUND.								
1,000	3½% G.P. Notes, 1854-55 ...	87/10/-	876	4 0	981	4 0	105	0 0
PROVIDENT FUND.								
5,000	3% Loan, 1941 ...	100/15/-	5,046	14 0	5,187	8 0	90	10 0
6,000	Fixed Deposit, One year, Imperial Bank of India ...		6,000	0 0	6,000	0 0		
8,28,100			2,91,062	4 0	3,24,591	14 0	33,529	10 0

STATEMENT No. 24.***Account.******1939.***

	Rs.	As.	P
By Depreciation, Investments revalued on 31-12-39 ..	33,529	10	0
Balance as per Balance Sheet	2,91,062	4	0
	3,24,591	14	0

STATEMENT No. 25.

1939.

Cash

For the year ended 31st

To	Rs.	As.	P.	Rs.	As.	P.
Balance from last Account ..			....	11,452	0	8
General Fund Account ..	33,165	10	3			
Oriental Publication Fund No. 1 Account	7,200	0	0			
Oriental Publication Fund No. 2 Account	4,800	0	0			
Sanskrit Manuscripts Fund Account ..	2,880	0	0			
Arabic and Persian Fund Account ..	2,500	0	0			
Barclay Memorial Fund Account ..	24	4	0			
Servants' Pension Fund Account ..	104	12	0			
Annandale Memorial Fund Account ..	138	8	0			
Permanent Library Endowment Fund Account ..	589	0	0			
Sir William Jones Memorial Fund Account	104	12	0			
Pramathanath Bose Memorial Fund Account ..	52	4	0			
Joy Gobind Law Memorial Fund Account	104	12	0			
Calcutta Science Congress Prize Fund Account ..	104	12	0			
Dr. Brühl Memorial Fund Account ..	34	12	0			
Provident Fund Account ..	1,451	11	3			
Advances Account ..	915	0	0			
Personal Account ..	30,149	4	7			
Publication Fund Account ..	459	2	9			
Savings Bank Deposit Account, Imperial Bank of India, Calcutta ..	6,702	0	8			
Fixed Deposit Account, Imperial Bank of India, Calcutta ..	20,000	0	0			
				1,11,480	9	6
				1,22,932	10	2

STATEMENT No. 26.

1939.

Balance

As at 31st

LIABILITIES.

	Rs.	As.	P.	Rs.	As.	P.
General Fund Account			2,50,988	6	6
Oriental Publication Fund No. 1 Account			16,768	7	2
Sanskrit Manuscripts Fund Account			24,824	1	3
Barclay Memorial Fund Account			685	10	8
Servants' Pension Fund Account			3,494	2	8
Annandale Memorial Fund Account			4,212	4	9
Permanent Library Endowment Fund Account			14,495	15	8
Sir William Jones Memorial Fund Account			2,777	15	0
Pramathanath Bose Memorial Fund Account			1,838	7	0
Joy Gobind Law Memorial Fund Account			2,733	0	0
Building Fund Account			6,321	9	6
Calcutta Science Congress Prize Fund Account			3,711	10	7
Dr. Brühl Memorial Fund Account			992	15	0
Building Repair Fund Account			5,995	9	6
International Catalogue of Scientific Literature, London			4,374	7	8
Provident Fund Account			14,330	6	11
Publication Fund Account			7,824	8	6
				3,66,369	10	4

We have examined the above Balance Sheet and the appended detailed accounts with the Books and Vouchers presented to us and certify that they are in accordance therewith, and, in our opinion, set forth correctly the position of the Society as at 31st December, 1939.

PRICE, WATERHOUSE, PEAT & CO.,

Calcutta,
17th January, 1940.

Auditors,
Chartered Accountants,
Registered Accountants.

STATEMENT No. 26.*Sheet.***1939.**

December, 1939.

ASSETS.

	Rs.	As.	P.	Rs.	As.	P.
Oriental Publication Fund No. 2 Account	3,144	15	1			
Arabic and Persian Manuscripts Fund Account	1,417	1	3			
	<hr/>			4,562	0	4
Advances Account .. .	1,895	0	0			
Personal Account	3,852	13	9			
	<hr/>			5,747	13	9
Deposits:—						
Savings Bank Deposit Account, Imperial Bank of India ..	1,380	10	11			
Fixed Deposit Account, Imperial Bank of India	50,000	0	0			
	<hr/>			51,380	10	11
Investment Account .. ..	....			2,91,062	4	0
Cash Account:—						
In hand	12	0	6			
With the Imperial Bank of India, on Current Account	13,604	12	10			
	<hr/>			13,616	13	4
				<hr/>		
				3,66,369	10	4
				<hr/>		

PERCY BROWN,
Honorary Treasurer.

[APPENDIX IV.]

Abstract Proceedings Council, 1939.

(Rule 48 f.)

ACCOMMODATION—

Letter of thanks from the Mining, Geological and Metallurgical Institute of India. Record.

No. 2. 30-1-39.

Request for the use of the Society's hall by the Secretary, Indian Red Cross Society. Approved.

No. 1. 20-3-39.

Request for the use of the Society's rooms and hall for the Committee meetings and General meetings by the Honorary Secretary, Calcutta Health Week. Grant. A charge of Rs.5 should be made for the use of the main hall but no charge will be levied for other rooms.

No. 3. 29-5-39.

Request for the use of the Society's hall by the Mining, Geological and Metallurgical Institute of India, on 18th August, 1939. Confirm General Secretary's action.

No. 21. 31-7-39.

Report of the General Secretary on the loan of the Society's rooms during the month to: (1) The Working Committee of the Calcutta Health Week. (2) The Mining, Geological and Metallurgical Institute of India. (3) The National Institute of Sciences of India. (4) The Mining, Geological and Metallurgical Society. Action of the General Secretary approved. Record.

No. 17. 28-8-39.

Letter from the Chief Warden, Ward No. 16, requesting the Society to place a room at his disposal for the office of the Air Raid Precaution Committee. No action.

No. 2. 30-11-39.

Letter dated 17-11-39 from the Hony. Secretary, Mining, Geological and Metallurgical Institute of India, requesting the use of the Society's hall for their annual meeting. Approve General Secretary's action.

No. 2. 12-12-39.

Letter dated 6-12-39 from Dr. H. C. Ray requesting that a suitable room be set aside for the use of research scholars.

Every facility to be given but no special room can be allotted.
No. 10. 12-12-39.

ANNUAL MEETING—

Letter from the Asst. Secretary to His Excellency the Governor of Bengal intimating acceptance of the invitation by His Excellency to preside over the Society's Annual Meeting. Record.

No. 4.

Annual Report. Approved.

No. 14.

31-1-39.

Annual Meeting. Arrangements approved.

No. 15.

31-1-39.

Letter from the Asst. Secretary to His Excellency the Governor of Bengal intimating the inability of His Excellency to be present at the Annual Meeting. Record.

No. 2.

27-2-39.

Letter from the Asst. Secretary to His Excellency the Governor of Bengal intimating that His Excellency has agreed to preside as Patron over the next Annual Meeting of the Society on Monday, the 5th February, 1940. Record. The word 'joint' to be omitted.

No. 23.

12-12-39.

ASSOCIATE MEMBERS—

Quinquennial re-election Associate Member.

Recommend for re-election for a further period of five years, Messrs. S. C. Ray and L. S. Dugin.

No. 4. (Special.)

27-2-39.

Letter from Miss M. L. W. Cleghorn, an old member of the Society (whose name was removed from the list of members under Rule 38) requesting that the Society should regularize her membership by treating her as a *mofussil* member.

Resolved that her name be proposed for election as an Associate Member.

No. 5.

25-9-39.

Proposal of election of two Associate Members:—

(a) Dr. E. W. E. Macfarlane (Mrs.), D.Sc. (London), and

(b) Miss Grace Lewison, M.A. (Chicago).

Recommend Dr. E. W. E. Macfarlane for election as an Associate Member. No recommendation to be made in the case of Miss Grace Lewison.

No. 7.

12-12-39.

BIBLIOTHECA INDICA—

Recommendation Finance Committee No. 8 of 27-2-39. The question of the settlement of remuneration for indexing *Tabaqat-i-Akbari*, English Translation, Volume II. Circulate. Accepted by Council.

No. 11.

27-2-39.

Recommendation Finance Committee No. 3 (d) of 17-3-39. The question of settlement of indexing charges of *Tabaqat-i-Akbari*. Final payment Rs.50 to be made. Accepted by Council.

No. 5.

20-3-39.

Recommendation Publication Committee No. 6 of 29-5-39. Postcard from Mehar Chand Lachman Das, Lahore, asking for permission to publish a new edition of 'Mirror of Composition', edited by Padma Das Mitra. Decline. The Society to revise and reprint a second edition under the editorship of Dr. S. K. De, Head of the Department

of Sanskrit, University of Dacca. Dr. S. K. De to be addressed. No remuneration. Accepted by Council.

No. 17.

29-5-39.

Letter from B. M. Press concerning Bibliotheca Indica and other R.A.S.B. works under printing in December, 1937.

Special Enquiry Committee to make recommendations.

No. 23.

29-5-39.

Recommendation Publication Committee No. 7 of 31-7-39. Application by Dr. M. Hidayat Hosain requesting to be allowed to edit 'Humayun Nama' by Ghiyath-ad-Din bin Humam-ad-Din, in the Bibliotheca Indica at the usual remuneration of Rs. 1-8 per page. Grant: remuneration Rs. 1-8 per page. Accepted by Council.

No. 15.

31-7-39.

Recommendation Publication Committee No. 9 of 31-7-39. Letter from Dr. M. Hidayat Hosain regarding editing of 'Maathir-ul-Umara' (English Translation), manuscript of which had been prepared by the late Mr. Beveridge. Request Dr. Baini Prashad to undertake the work. Accepted by Council.

No. 15.

31-7-39.

Recommendation Publication Committee No. 10 of 31-7-39. On the proposal of Mr. M. Haq seconded by Dr. M. H. Hosain it was unanimously resolved that the thanks of the Publication Committee be conveyed to Dr. Baini Prashad for the prompt and excellent manner in which he has carried out the difficult task of editing the Tabaqat-i-Akbari resulting in its publication in so short a time. Accepted by Council.

No. 15.

31-7-39.

Recommendation Publication Committee No. 1 (iv) of 21-8-39. Letter from Dr. Baini Prashad dated 17-8-39 from Murree relating to completion and preparation of the English Translation of 'Maathir-ul-Umara'. Accept in principle the request of Dr. Baini Prashad for clerical and other assistance and recommend its acceptance to the Council when full details are furnished. Accepted by Council.

No. 10.

28-8-39.

Recommendation Publication Committee No. 8 of 18-9-39. To issue a Persian collated edition of Bhagwat Gita. Accept with thanks Dr. Baini Prashad's proposal and offer to do the work. Accepted by Council.

No. 13.

25-9-39.

Bill of Messrs. Stephen Austin & Sons, Ltd., for £102-0-9 for printing Ain-i-Akbari. Resolved that they be requested to furnish a complete account in detail from the inception of the work together with copies of all relevant reminders; that the account be thoroughly checked to the entire satisfaction of the Finance Committee; and the payment of the amount found due be authorized by the Finance Committee.

No. 21.

25-9-39.

Recommendation Publication Committee No. 5 of 24-11-39. Preface for the Tabaqat-i-Akbari, English Translation, Volume III by Dr. Baini Prashad. Accept the recommendations of the Philological Secretaries and the referees. Read and Journal. Accepted by Council.

No. 12.

30-11-39.

Recommendation Publication Committee No. 6 of 24-11-39. Letter from Prof. M. Mahfuz-ul Haq, dated 9-11-39, requesting permission to employ the services of an Assistant for a period of 3 months on a salary of from Rs.20 to Rs.25 per month to assist him in the preparation of the collation of the MSS. of the Haft-Iqlim. An Assistant may be employed for a period of three months on a salary of from Rs.20 to Rs.25. Accepted by Council.

No. 12.

30-11-39.

Recommendation Publication Committee No. 2 of 12-12-39. Request from Dr. M. Hidayat Hosain to be permitted to edit the Persian text of 'Tarikh-i-Humayuni' by Bayazid in the Bibliotheca Indica Series at the usual remuneration of Rs.1-8 per page. Grant. Accepted by Council.

No. 17.

12-12-39.

Recommendation Publication Committee No. 3 of 12-12-39. Request from Dr. M. Hidayat Hosain to obtain from the British Museum rotograph or typed copies (whichever is cheaper) of Memoirs of Bayazid Bayat translated by Erskine, and Ehwand Mir's Humayun Nama translated by Munshi Sadasukh Lal. Grant. Accepted by Council.

No. 17.

12-12-39.

Recommendation Publication Committee No. 4 of 12-12-39. Reprint of Avadana Kalpalata. Prof. D. Chattopadhyaya of Bethune College to be entrusted with the work of editing at a reduced rate to be fixed by the General Secretary. Accepted by Council.

No. 17.

12-12-39.

Recommendation Publication Committee No. 6 of 12-12-39. Letter from K. S. Paul in connection with the publication of 'Dowa Sangmo's Namthar'. To be referred to experts. Accepted by Council.

No. 17.

12-12-39.

The publication of the following works, the completion of which was left to the late General Secretary, Mr. Johan van Manen: Vajjalagam and Vaikhanasasrautasutra.

Put up before the Publication Committee. The General Secretary to write to Mr. van Manen and fix a time limit for him to complete the works, otherwise the works to be withdrawn from him and other arrangements made for their publication.

No. 22.

12-12-39.

BUDGET—

Recommendation Finance Committee No. 5 of 30-1-39. The General Secretary drew attention to the reduction in the Government of India grant for Arabic and Persian MSS. and asked for consideration of this in connection with the budget for 1939 as passed. Place before Council. Council order: no action.

No. 10.

30-1-39.

The Budget estimates for 1939 with special reference to the curtailment by the Government of India of the Persian and Arabic MSS. grant.

The General Secretary to make a reference in presenting the report; a note summarizing his remarks to be embodied in the proceedings of the meeting.

No. 3. (Special.)

27-2-39.

Recommendations of the Special Finance Committee of 7-12-39.

Accept but Rs.4,000 only to be transferred to the Permanent Reserve, the balance of the surplus being set aside for the appointment of a second Assistant Secretary.

No. 14.

12-12-39.

Recommendation Finance Committee No. 2 (d) of 7-12-39. Budget estimates for 1940. Accept. A very satisfactory budget. Unanimously recommended that a sum of Rs.5,000 be transferred to the Permanent Reserve Fund from the surplus in 1940. Accepted by Council.

No. 15.

12-12-39.

BUILDING—

Recommendation Finance Committee No. 7 of 27-2-39. Building repairs estimates from Messrs. J. B. Norton & Co., Martin & Co., etc. Accept. Accepted by Council.

No. 11.

27-2-39.

Recommendation Finance Committee No. 3 (b) of 28-8-39. Repairing of the Malthoid Roofing on the Society's premises undertaken by Messrs. Lyall Marshall & Co. Write to Messrs. Martin & Co. direct, copy to Messrs. Lyall Marshall & Co. regarding their guarantee of eight years. Accepted by Council.

No. 8.

28-8-39.

Recommendation Finance Committee No. 6 of 5-10-39. Estimate from Messrs. J. B. Norton & Sons, Ltd. for Rs.46 for the installation of an unfiltered water hydrant for washing surface drains. Accept and put the work in hand at once. Accepted by Council.

No. 9.

30-11-39.

COMMITTEES—

Constitution of Standing Committees of the Society for 1939-40. The Standing Committees to be as follows:—

(a) Finance Committee :

President	} <i>Ex-Officio.</i>
Treasurer	
General Secretary	
Sir U. N. Brahmachari.	
Lt.-Col. N. Barwell.	
Dr. Baini Prashad.	
Dr. J. N. Mukherjee.	
Dr. S. P. Mookerjee.	
Dr. C. S. Fox.	
Dr. S. C. Law.	

(b) Library Committee :

President	} <i>Ex-Officio.</i>
Treasurer	
General Secretary	
Philological	} <i>Secretaries.</i>
Jt. Philological	
Biological	
Physical Science	
Anthropological	
Medical	
Library	

(c) *Publication Committee :*

President	}	<i>Ex-Officio.</i>
Treasurer		
General Secretary		
Philological	}	<i>Secretaries.</i>
Jt. Philological		
Biological		
Physical Science		
Anthropological		
Medical		
Library		

No. 8.

27-2-39.

Letter from Dr. Baini Prashad. That a Special Committee be appointed to enquire into the general administration and cultural activities of the Society, and to submit to the April Meeting of Council a detailed report with recommendations, if any, for effecting necessary improvements. The Committee also to report on the alleged discrepancies between Rules and Regulations on the one hand and existing procedure and practices of the Society on the other.

The Committee to consist of:

Sir John Lort-Williams (Chairman),
 Dr. Baini Prashad (Secretary),
 Dr. M. N. Saha,
 Dr. S. P. Mookerjee,
 Dr. J. N. Mukherjee,
 Dr. C. S. Fox,
 and the Ex-Officio Members.

Five members to form a quorum.

No. 10.

27-2-39.

Resolved that the terms of reference made to the re-organization Committee appointed on 28-3-38 be deemed made to the Special Enquiry Committee appointed on 27-2-39 to enable the latter to deal with any points left undisposed of by the previous committee.

No. 21.

24-4-39.

On the proposal of Sir John Lort-Williams, seconded by Dr. Baini Prashad, it was resolved that three members should form a quorum of the Special Enquiry Committee appointed by the Council at the meeting held on Monday, the 27th February, 1939.

No. 2.

29-5-39.

Letter from the Honorary General Secretary, All-India Oriental Conference, Dacca, regarding a proposal for instituting an Indian Academy of Arts and Letters.

A new Sub-Committee consisting of Dr. S. K. Chatterji, Dr. M. Hidayat Hosain and the General Secretary be formed to frame suggestions for submission to the Council.

No. 7.

31-7-39.

Consideration of the final report of the Special Enquiry Committee appointed by the Council on the 27th February, 1939.

On the proposal of Sir John Lort-Williams, seconded by Dr. S. P. Mookerjee, it was unanimously resolved to adopt the final report of the Special Enquiry Committee in toto. The General Secretary was directed to take necessary action to give effect to the recommendations made in the report.

On the proposal of Dr. S. P. Mookerjee, seconded by Sir David Ezra, it was unanimously resolved to record the thanks of the Council to Sir John Lort-Williams, for the services rendered to the Society and the hard work performed by him as Chairman of the Special Enquiry Committee.

On the proposal of Col. N. Barwell, seconded by Major C. L. Pasricha, it was unanimously resolved to record the thanks of the Council to all the members of the Special Enquiry Committee for the extremely satisfactory manner in which they have carried out the unusually arduous duties imposed on them by this enquiry, a task which has involved a considerable amount of time and labour.

No. 2. (Special.)

10-8-39.

General Secretary's report of acceptance from Dr. D. R. Bhandarkar, Dr. U. N. Ghosal and Dr. R. C. Majumdar of their nominations as the Society's delegates at the forthcoming Indian History Congress. Record.

No. 16.

25-9-39.

CONDOLENCE—

The President moved that the Society should send a letter of condolence to the Lady Brabourne, expressing regrets at the death of Lord Brabourne, Patron and Member of the Society.

Adopted all present standing.

27-2-39.

Letter of thanks from the Private Secretary to the Governor of Bengal conveying thanks from the Lady Brabourne. Record.

No. 2.

24-4-39.

COPPER PLATES—

Letter from the Asst. Secretary to His Excellency the Governor of Bengal regarding the receipt of the missing Bhowal Copper-plate inscription of Lakshmanasena from the India Office through His Excellency the Governor of Bengal.

Resolved that an expression of the Council's deep gratitude and of His Excellency's personal interest in bringing the Bhowal Copper-plate inscription from the India Office and handing it over to the President of the Society be conveyed to him.

No. 16.

30-11-39.

Letter dated the 7th December, 1939, from Dr. N. K. Bhattasali in respect of the editing of the Bhowal Copper-plate of Lakshmanasena and requesting that the plate may be lent to him.

Impressions or photostat copies may be supplied. The plate cannot be issued on loan.

No. 21.

12-12-39.

COUNCIL—

Vote of thanks to the outgoing Council. Resolved that the Council's thanks be conveyed to the outgoing members of Council.

No. 16.

31-1-39.

The General Secretary reported that with regard to Council Circular No. 31, dated the 23rd February, 1939, concerning the date and time

for the postponed Council and Committee meetings for February the result had been as follows:—

Saturday, 25th February at 10 A.M.	..	..	5
" " " 3 P.M.	..	..	1
Monday, 27th " " 5-15 to 5-25 P.M.	..	..	10
Saturday morning unsuitable	..	..	2
Unexpressed opinion	..	..	2

Accordingly he had sent out revised notices for Monday, the 27th February, 1939, at 5-15 P.M. Action approved.

27-2-39.

Acceptance seat on Council by the Council members. Record.

No. 1. 27-2-39.

Absence of Honorary Treasurer from Calcutta. Dr. B. S. Guha to officiate as Honorary Treasurer to the Society during the absence of the Honorary Treasurer Mr. Percy Brown, from 1-4-39 until notification of the latter's return to Calcutta and resumption of office.

No. 12. 27-2-39.

Date next Council Meeting. Monday, March 20th.

No. 17. 28-2-39.

Proposed by Dr. Saha and seconded by Dr. Guha that the Council is of opinion that the General Secretary should attend office during normal office hours. Passed by a majority of 9.

No. 11. 20-3-39.

Recommendations of the Special Enquiry Committee. Accepted unanimously.

Dr. Guha to be Acting General Secretary and Dr. Baini Prashad to be Acting Treasurer for the period 25th April to 22nd July, 1939.

No. 18. 24-4-39.

A letter from the President, Sir David Ezra, regretting his inability to attend this meeting was read and recorded.

No. 1. 29-5-39.

Letter from Dr. S. L. Hora to the President. Reply to Dr. Hora in suitable terms and inform him that the Council is assured that the language used by the General Secretary (now on special duty) in his correspondence with Dr. Hora was not intended to give offence in any way.

No. 7. 29-5-39.

Letter from the Maharajadhiraja of Burdwan intimating absence from Calcutta for five months from June 1939. Record.

No. 19. 29-5-39.

Resolved that in future only important and controversial matters should be circulated. Circulars except in case of extreme urgency should be sent to members of Council and Committees in batches.

It was also resolved that when submitting agenda to members sufficient details should be given in the case of each item thereof, as will enable members clearly to understand its import.

No. 27. 29-5-39.

Letter from Mr. Johan van Manen dated 24-6-39 resigning his office as General Secretary to the Society with effect from 1-7-39.

Proposed by Sir John Lort-Williams and seconded by Dr. S. P. Mookerjee.

- (a) That the Council do accept the resignation of the General Secretary with effect from the 1st July, 1939.
- (b) That the Council records the opinion that the work of the Society has suffered during the last few years on account of the failure of the General Secretary to perform his duties fully. The Council notes in this connection the statement made by the General Secretary that he has been in continued ill-health in recent years.
- (c) That in view of the services rendered by the General Secretary in the earlier years and also in view of the fact that he is resigning his office about seven months before the expiry of his present term, the Council sanctions a gratuity of a lump sum of Rs.10,000 to be paid to him as soon as the resignation takes effect.

Carried unanimously.

On the proposal of Dr. S. P. Mookerjee, seconded by Dr. Baini Prashad, it was further resolved that under Rule 45 Dr. B. S. Guha be appointed General Secretary from the 1st July, 1939, to the end of the term, vice Mr. Johan van Manen, resigned, subject to confirmation of the next subsequent Ordinary General Meeting.

On the proposal of Dr. S. K. Chatterji, seconded by Col. N. Barwell, it was further resolved that under Rule 45 Mr. H. C. Chakladar be appointed Anthropological Secretary from the 1st July, 1939, to the end of the term, vice Dr. B. S. Guha, appointed General Secretary, subject to confirmation of the next subsequent Ordinary General Meeting.

No. 1.

26-6-39.

Letter from Percy Brown. Dr. Baini Prashad to continue to perform the duties of Treasurer.

No. 2.

31-7-39.

Letter from Mr. Johan van Manen accepting the Council decision of 26-6-39. Record.

No. 19.

31-7-39.

Interpretation of Rule 44 (g) read in conjunction with Rule 4 of the Society with special reference to the election of Council for 1940-41. Postpone consideration until after the Annual Meeting, 1940.

No. 6.

30-11-39.

Informal consideration, composition of Council, 1940-41.

After discussion, the following list of candidates for nomination to next year's Council was placed before the meeting for consideration:—

President	..	..	Bt.-Col. R. N. Chopra.
Vice-President	..	..	The Hon'ble Mr. Justice John Lort-Williams, Kt.
"	"	..	Maharajadhiraja Sir Bijay Chand Mahtab of Burdwan.
"	"	..	Dr. C. S. Fox.
"	"	..	Dr. S. P. Mookerjee.
General Secretary	..	..	Dr. B. S. Guha.
Treasurer	..	..	Dr. Baini Prashad.
Philological Secretary	..	..	Dr. S. K. Chatterji.

Jt. Philological Secretary ..	Prof. M. Mahfuz-ul Haq.
Nat. Hist. Secretary (Biology)	Dr. Kalipada Biswas.
„ „ „ (Phy. Science)	Prof. Meghnad Saha.
Anthropological Secretary ..	Mr. H. C. Chakladar.
Medical Secretary ..	Sir U. N. Brahmachari.
Library Secretary ..	Prof. J. N. Mukherjee.
Member of Council ..	Dr. M. Hidayat Hosain.
„ „ ..	Percy Brown, Esq.
„ „ ..	Major C. L. Pasricha.
„ „ ..	Dr. S. C. Law.
„ „ ..	W. D. West, Esq.
„ „ ..	Dr. Kalidas Nag.

Unanimously resolved that the General Secretary do print and circulate to the members of Council the list of the Council as at present constituted, together with the new list placed before the meeting, and provided with a blank column for additional names; and that these lists be returned to the General Secretary within a week of date of issue; and that a list be compiled of the candidates finally proposed and be placed before the next Council Meeting to be voted upon.

No. 14.

30-11-39.

Fixing dates for the Budget (1940) Committee and Council meetings in December, 1939.

The special meeting of the Finance Committee for consideration of the Budget for 1940 to be held on Thursday, the 7th December, 1939, and to be followed by the ordinary meeting of the Finance Committee for December, 1939.

The Council, and the Library and the Publication Committees to meet on Tuesday, the 12th December, 1939.

A special meeting of the Council for consideration of the Annual Report to be held on Thursday, the 11th January, 1940.

No. 15.

30-11-39.

Letter dated 5-12-39 from Bt.-Col. R. N. Chopra withdrawing his nomination by the Council to Presidentship of the Society for 1940-41 in favour of Sir John Lort-Williams. Record.

No. 3.

12-12-39.

Letter dated 6-12-39 from Dr. M. Hidayat Hosain intimating the withdrawal of his nomination for a seat on the Council for 1940-41. Record.

No. 4.

12-12-39.

Letter dated 5-12-39 from Sir U. N. Brahmachari intimating the withdrawal of his nomination for a seat on the Council for 1940-41. Record.

No. 5.

12-12-39.

Council nomination, 1940-41.

The General Secretary reported that 19 Council members had returned the list of candidates circulated, duly signed, and with a number of alternative suggestions.

After discussion resolved that the following names be declared as Council's candidates for election to next year's Council, and that the list be ordered to be issued to Resident Members, as prescribed in Rule 44.

President ..

.. The Hon'ble Mr. Justice J. Lort-Williams, Kt.

Vice-President ..	..	Bt.-Col. R. N. Chopra.
" " ..	..	Maharajadhiraja Bahadur Sir Bijay Chand Mahtab of Burdwan.
" " ..	..	Dr. C. S. Fox.
" " ..	..	Dr. S. P. Mookerjee.
General Secretary ..	..	Dr. B. S. Guha.
Treasurer ..	..	Dr. Baini Prasad.
Philological Secretary ..	..	Dr. S. K. Chatterji.
Jt. Philological Secretary ..	..	Prof. M. Mahfuz-ul Haq.
Nat. Hist. Secretary (Biology) ..	..	Dr. Kalipada Biswas.
" " " (Phy. Science) ..	..	Prof. Meghnad Saha.
Anthropological Secretary ..	..	Mr. H. C. Chakladar.
Medical Secretary ..	..	Major C. L. Pasricha.
Library Secretary ..	..	Prof. J. N. Mukherjee.
Member of Council ..	..	Mr. Percy Brown.
" " ..	..	Dr. S. C. Law.
" " ..	..	Dr. Kalidas Nag.
" " ..	..	Sir S. Radhakrishnan, Kt.
" " ..	..	Prof. M. Z. Siddiqi.
" " ..	..	Mr. W. D. West.

No. 19.

12-12-39.

EXCHANGE OF PUBLICATIONS—

Recommendation Library Committee No. 5 of 30-1-39. Request for exchange of publications from:

- (a) Deutsches Kolonial-und Uebersee Museum, Bremen. Decline.
- (b) State Public Library, Leningrad, Russia. Ask for further information.
- (c) Editor, Journal of Indian History, Madras. Grant; exchange Journal from 1935 onwards.

Accepted by Council.

No. 11.

30-1-39.

Recommendation Library Committee No. 5 of 27-2-39. Request for exchange of publications from the Library, Government General of Chosen (Chosen Sotokofu Toshekan), Keijo. Decline. Accepted by Council.

No. 13.

27-2-39.

Recommendation Library Committee No. 2 of 20-3-39. Request for an exchange of the Society's Memoirs from the Director, Science Museum, London. Grant. Accepted by Council.

No. 6.

20-3-39.

Recommendation Library Committee No. 3 of 24-4-39. Letter from the Vice-President, Pushtu-Tolana, Kabul, Afghanistan, requesting an exchange of publications. Await reply. Accepted by Council.

No. 15.

24-4-39.

Recommendation Library Committee No. 1 of 29-5-39. Application for an exchange of the Society's publications from the Editor, Jaina Siddhanta Bhaskara, Arrah. Exchange Journal only. Accepted by Council.

No. 16.

29-5-39.

Recommendation Library Committee No. 2 of 29-5-39. Application for an exchange of the Society's publications from the State Public

Library, Leningrad. Write and ask them if they are agreeable to exchange the regular issues of their Journal. Accepted by Council.

No. 16.

29-5-39.

Recommendation Library Committee No. 3 of 29-5-39. Application for an exchange of the Society's publications from the Afghan Academy, Kabul. Exchange Journal and Memoirs. Accepted by Council.

No. 16.

29-5-39.

Recommendation Library Committee No. 1 of 26-6-39. Application for exchange of publications from the Professor of Biology, Stanford University, California, U.S.A. Exchange Journal only.

No. 6.

26-6-39.

Recommendation Library Committee No. 2 of 31-7-39. Application for exchange from the Assistant Secretary and Superintendent, Oriental Publication Bureau and Dairat-ul-Maarif Press, Hyderabad, Deccan. Exchange Arabic and Persian works of Bibliotheca Indica Series. Accepted by Council.

No. 14.

31-7-39.

Letter from the Secretary, Entomological Society of India, requesting the Society to subscribe to the Indian Journal of Entomology. Exchange Journal and Proceedings.

No. 15.

28-8-39.

Recommendation Library Committee No. 3 of 24-11-39. Request from the National Library of Peiping, China, for free supply of the Society's Journal and Proceedings in 1940. Also a request for exchange of the Society's Journal with theirs. Grant and exchange. Accepted by Council.

No. 10.

30-11-39.

Recommendation Library Committee No. 7 of 24-11-39. Correspondence with the Shibli Academy, Azamgarh, for exchange of publications. Exchange Arabic and Persian text only. Ask for a complete set of 'Maarif' issued up to date. Accepted by Council.

No. 10.

30-11-39.

Recommendation Library Committee No. 2 of 12-12-39. Request from the Societe des Oceanistes, Paris, for exchange of publications. Defer until the Bulletin is received. Accepted by Council.

No. 16.

12-12-39.

Recommendation Library Committee No. 4 of 12-12-39. Circular letter from the Chancellor, Reale Accademia d' Italia, Rome, intimating that the Reale Accademia dei Lincei has now been amalgamated with the Reale Accademia d' Italia and that the publications of the former commencing from July, 1939, will be published as a new series in the 'Atti della Reale Accademia d' Italia' divided into 'Proceedings' and 'Memoirs' of the categories of moral and historical sciences and of physical, mathematical and natural sciences. Exchange one set only of the Journal and Memoirs. Accepted by Council.

No. 16.

12-12-39.

Letter, dated the 8th December, 1939, from Diwan Bahadur S. E. Runganathan, Vice-Chancellor, University of Madras, intimating that the Annals of Oriental Research of that University will be sent to the

Society in exchange for the issues of the Bibliotheca Indica Series.

Accept in exchange.

No. 20.

12-12-39.

FINANCE—

Recommendation Finance Committee No. 3 of 27-2-39. Auditor's report for 1938-39. Record. Accepted by Council.

No. 11.

27-2-39.

Recommendation Finance Committee No. 4 of 27-2-39. Bad debts to be written off owing to deaths, resignations, etc. of members. Write off. Accepted by Council.

No. 11.

27-2-39.

Letter No. 477-Misc. of 21-4-39 from the Education Department, Government of Bengal.

- (i) The reply sent by Mr. van Manen as General Secretary and the action taken by the Acting General Secretary were considered.

Resolved that the action taken by the Acting General Secretary be approved. The draft replies put up by the latter were discussed.

- (ii) Resolved that, in view of the fact that the Council met on Monday, the 24th April, the letter from Government referred to above dated 21-4-39 should have been brought by Mr. van Manen, the General Secretary, to its notice before a reply was sent out to the Government.

- (iii) On a proposal by Sir John Lort-Williams and seconded by Dr. J. N. Mukherjee it was resolved that the following reply should be sent to the Government of Bengal's letter No. 477-Misc. of 21-4-39.

Question.

Answer.

261. Will the Hon'ble Minister in charge of the Finance Department be pleased to state:

(a) the amount of annual grant made by the Government of Bengal during the years, 1935, 1936 and 1937 to the Royal Asiatic Society of Bengal;

(b) whether audited accounts are received from that body by the Government before the grant is made each year;

(c) whether items of expenditure undergone by that body are subjected to departmental examination by the Government before the grant is sanctioned year after year;

(a) During 1935, 1936 and 1937 the Royal Asiatic Society of Bengal received from the Government of Bengal grants amounting to Rs.46,440. Of this amount grants of Rs.4,800 (an annual grant of Rs.1,600) were in direct aid of the Society's work and Rs.41,600 were earmarked for specific performances in connection with publication of oriental works in various languages.

(b) Audited accounts of the Society are placed before its Annual Meeting held in February of each year and copies are supplied to the Government of Bengal whenever called for.

(c) The Society is not aware whether any departmental examination of the items of expenditure is carried out by Government before the grants are renewed.

(d) the total income of that body in the years 1935, 1936 and 1937 and expenditure in each of those three years on salaries and allowances of the staff;

(d) The total income of the Society during the years 1935, 1936 and 1937 amounted to Rs.2,00,231-2-4 including the annual grants for specific purposes.

The total expenditure on staff for salaries and allowances during each of these years was in 1935 Rs.20,000, in 1936 Rs.22,088 and in 1937 Rs.21,098, total Rs.63,186. This includes Rs.29,500 paid to the General Secretary referred to in answer (e) and is made up as follows:

1935	..	Rs.	9,000
1936	..	..	11,500
1937	..	..	9,000

(e) the total amount that has been drawn by the General Secretary from 1935-1937; and

(e) The reply is given in answer (d).

(f) whether the office of the General Secretary was honorary before the present incumbent of the post came in?

(f) With regard to question (f) this is a matter of internal administration which concerns the Society alone. However for your information the Council has no objection to stating that some 16 years ago with a view to better administration, it was decided to make the present incumbent of the office, General Secretary, subject to annual re-election according to Rules, on the condition that he devoted his whole time to the work of the Society, and a payment was made to him of Rs.500 monthly which was increased subsequently to Rs.750. This arrangement is still in force.

No. 1. (Special.)

3-5-39.

Recommendation Finance Committee No. 3 (c) of 29-5-39. Correspondence re: Society's income for 1935-1937. Record (minute of dissent by Mr. Johan van Manen was also recorded). Accepted by Council.

No. 15.

29-5-39.

Re-investment of Rs.10,000, on fixed deposit. Re-invest.

No. 1.

28-8-39.

Recommendation Finance Committee No. 6 of 18-9-39. Meeting of Finance Committee and payments during October, 1939 (Puja Holidays). Finance Committee to meet early in October, 1939. Accepted by Council.

No. 14.

25-9-39.

Recommendation Finance Committee No. 13 of 28-11-39. Permanent Reserve. Transfer of amount received through admission fees, 1938-

1939 (postponed from the previous meeting item No. 7). Transfer in the usual manner. Accepted by Council.

No. 9.

30-11-39.

Recommendation Finance Committee No. 7 of 24-11-39. Bad debts written off owing to deaths, resignations, operation of Rule 38, etc. Write off. Accepted by Council.

No. 9.

30-11-39.

Recommendation Finance Committee No. 3 of 7-12-39. Authority for payment of bills by the General Secretary and Treasurer till next Finance Committee Meeting. Grant. Accepted by Council.

No. 15.

12-12-39.

GRANTS—

Correspondence with the Government of India, Department of Education, Health and Lands, in connection with the Annual Grant to the Society. Record.

No. 5.

30-1-39.

Letter from Sir James Grigg, late Finance Member, Government of India, concerning the Arabic and Persian grant from the Central Government. Record.

No. 12.

29-5-39.

HONORARY FELLOWS—

Proposal for the election of Honorary Fellows (names proposed Sir S. Radhakrishnan, Dr. H. Luders, Marquis of Zetland and Sir Jadunath Sircar). Unanimously recommended for election.

No. 9.

31-7-39.

Letter of thanks from Sir Jadunath Sircar for his election as an Honorary Fellow of the Society. Record.

No. 9.

25-9-39.

Letter of thanks from Sir S. Radhakrishnan for his election as an Honorary Fellow of the Society. Record.

No. 10.

25-9-39.

Letter of thanks from the Most Hon'ble the Marquis of Zetland for his election as an Honorary Fellow of the R.A.S.B. Record.

No. 7.

30-11-39.

INDIAN SCIENCE CONGRESS ASSOCIATION—

Letter of thanks from the General Committee of the Indian Science Congress Association. Record.

No. 3.

30-1-39.

Recommendation Finance Committee No. 6 of 24-4-39. Letter dated 11-4-39 from the Treasurer, Indian Science Congress Association, to the Imperial Bank of India, Park Street, concerning separation of accounts from the Society. Accepted by Council. Give effect to proposals.

No. 14.

24-4-39.

Letter from the General Secretary, Indian Science Congress Association. Refer to the Special Enquiry Committee.

No. 4. 29-5-39.

Recommendation Finance Committee No. 9 of 5-10-39. Indian Science Congress Association contribution for 1939. Postpone until next meeting. Accepted by Council.

No. 9. 30-11-39.

Recommendation Finance Committee No. 15 of 24-11-39. Contribution from the I.S.C.A. for 1939 (postponed from the previous meeting item No. 9). The I.S.C.A. to be asked to contribute Rs.200. Accepted by Council.

No. 9. 30-11-39.

INVITATIONS—

Invitation to the Society to send delegates from the Society to attend the XVIIIth International Geological Congress to be held in London in 1940. Dr. Heron be requested to represent the Society.

No. 6. 30-1-39.

Invitation from the Seventh International Congress of Genetics.

Invite Sir Thomas Holland, Lt.-Col. E. D. W. Greig and Lt.-Col. A. D. Stewart to arrange amongst themselves for a suitable representation of the Society at the Congress.

No. 4. 24-4-39.

Invitation from the Secretary. Bengali Literary Conference at Comilla. Record.

No. 5. 24-4-39.

Invitation from the Royal Swedish Academy of Sciences. Invite Prof. Sten Konow to represent the Society.

No. 6. 24-4-39.

Invitation from the President and Trustees of the San Jacinto Museum of Natural History Association. Record.

No. 7. 24-4-39.

Invitation from the Catholic University of America to send representatives of the Society to attend the 50th Anniversary celebration of the University. Send usual good wishes of the Society.

No. 2. 26-6-39.

Letters from the Secretary, Indian History Congress. Dr. Bhandarkar, Dr. R. C. Majumdar and Dr. U. N. Ghosal to be the Society's delegates.

No. 2. 28-8-39.

Letter dated the 18th August, 1939, from Prof. Kalidas Nag. As the Society has not been invited to send a delegate it is regretted that the offer must be declined.

No. 5. 28-8-39.

Letter from Lt.-Col. E. D. W. Greig, who was appointed one of the delegates of the Society at the Seventh International Congress of Genetics, Edinburgh, forwarding a copy of the programme of the Congress for the information of the Society. Record.

No. 8. 25-9-39.

Letter from the Dy.-President, All-India Oriental Conference at Hyderabad, asking the Society to nominate delegates and to assist the Conference financially. No action.

No. 3. •

30-11-39.

LEASE—

Recommendation Finance Committee No. 3 (e) of 17-3-39. Arrears of rent from Messrs. Lekhraj Shewakram & Co., Lessee of 1-B, Park Street, for 5 months, November 1938 to March 1939. Professional opinion to be asked from Messrs. R. M. Chatterjee & Co., Solicitors (Calcutta 2868), 6, Old Post Office Street. Council order: action to be held over till dates mentioned in their letter of 27-3-39.

No. 5.

20-3-39.

Recommendation Finance Committee No. 7 of 24-4-39. Renewal of lease: Standard Vacuum Oil Co. Ask opinion, as to the advisability of the exercise of the option being granted, from J. N. Basu, Esq., Solicitor, Messrs. B. N. Basu & Co., Temple Chambers, Old Post Office Street, Calcutta. Accepted by Council.

No. 14.

24-4-39.

Letter from Solicitor, Mr. J. N. Basu, concerning the renewal of the lease by the Standard Vacuum Oil Co. Accept and record.

No. 6.

29-5-39.

Renewal of lease of premises at 1/2, Park Street by the Standard Vacuum Oil Co. Documents to be prepared by Messrs. B. N. Basu & Co.

No. 10.

26-6-39.

Correspondence with the Standard Vacuum Oil Co. concerning lease. Record with satisfaction.

No. 8.

31-7-39.

LECTURES—

Consideration of holding General lectures, during winter, 1939-40. General Secretary to arrange.

No. 17.

31-7-39.

LIBRARY—

On the proposal by the Maharajadhiraja Bahadur of Burdwan resolved that a list of books and MSE. lost during the last ten years be prepared and submitted to the Council.

No. 20.

24-4-39.

Recommendation Finance Committee No. 6 of 26-6-39. Estimates of binding of books of plates, etc. Accept estimate of Yanus Ali. Give Yanus Ali a trial order up to Rs.500 in the first instance. Accepted by Council.

No. 5.

26-6-39.

Recommendation Library Committee No. 6 of 31-7-39. Letter from the President, Anthropological Institute, Calcutta, requesting the Society to subscribe to its Journal. Subscribe. Accepted by Council.

No. 14.

31-7-39.

Recommendation Library Committee No. 3 of 21-8-39. Report on the binding of books of plates, etc. done by Yanus Ali as a trial order.

As the results of the trial order given to Yanus Ali have proved satisfactory the balance of the special binding work be given to him. Accepted by Council.

No. 9.

28-8-39.

Recommendation Library Committee No. 4 of 21-8-39. The General Secretary reported that the stock-taking of the General Section of the Library had commenced; that so far as can be ascertained this had not been done for about 60 years; and that so far a considerable number of works had been found of which no entries were traceable in the records. On the proposal of Mr. Mahfuzul Haq, seconded by Dr. Hidayat Hosain, it was unanimously resolved to record the Committee's appreciation of the work being done by the General Secretary and the staff, for the measures taken for the proper preservation of the Society's possessions and putting the library on a sound working basis. Accepted by Council.

No. 9.

28-8-39.

Letter from Mr. S. Mozumdar requesting the loan of the Descriptive Catalogue of Persian MSS. with its two supplements by Ivanow. Grant. Apply rules.

No. 19.

28-8-39.

Recommendation Finance Committee No. 5 of 5-10-39. Application from Yanus Ali Bhuya, Bookbinder, asking for an enhancement of prices on his estimates for the special binding of the books and volumes in the South room library. Grant an increase of Rs.2 per book or 25% of the amounts originally estimated, whichever is less. Accepted by Council.

No. 9.

30-11-39.

Recommendation Finance Committee No. 14 of 28-11-39. Consideration of the Permanent Library Endowment Fund (postponed from the previous meeting, item No. 8). Transfer Rs.1,600 from the temporary reserve. Accepted by Council.

No. 9.

30-11-39.

Letter from Lt.-Col. N. Barwell forwarding Rs.100 as a donation to the Library Endowment Fund. Record. Letter of thanks to be sent to Lt.-Col. Barwell.

No. 24.

12-12-39.

LOAN OF MSS.—

Application for loan of manuscript: 'Vivaranaprimeyasangraha' from the Registrar, University of Madras. Lend against indemnity bond to the value of Rs.200.

No. 8.

30-1-39.

Application for loan of MSS. from:

- (a) Mr. T. R. Chintamani, Madras University, for 'Smriti-manjari'. Decline.
- (b) The Director, Adyar Library, for two MSS. of 'Asvalayana Gṛhya Sutra'. Lend against indemnity bonds to the value of Rs.200 each.
- (c) Mr. O. C. Gangoly for 'Nataka Nirnaya'. (Renewal application.) Lend against indemnity bond to the value of Rs.200 for a further period of six months, this to be the final period.
- (d) The Vice-Principal and Curator, Prachya Grantha Samgraha, Ujjain, for 'Nataka Nirnaya'. Decline, as the manuscript is out on loan.

No. 7.

27-2-39.

Application for the loan of 'Apastambhasmriti' manuscript from the Honorary Director, Adyar Library, Madras. Lend against indemnity bond to the value of Rs.500.

No. 3.

20-3-39.

Application for an extension of the period of loan of manuscripts from Dr. N. N. Law and Mrs. Roma Chaudhuri.

Grant extension to Dr. Law and Mrs. Roma Chaudhuri as requested six and three months respectively.

No. 11.

24-4-39.

Application for the loan of manuscripts from:—

(a) Benares Hindu University for two MSS. of Dhurt Swamibhashya. Grant the loan of the two MSS. for 3 months against indemnity bonds to the value of Rs.300 and Rs.250 respectively.

(b) Travancore University for 'Pasupata Sutras'. Grant the loan for three months against indemnity bond to the value of Rs.100. Loan to be acknowledged in any publication produced with the aid of the manuscript.

(c) Mr. T. R. Chintamani, Madras University, 'Amarakosa Vyakhya' by Rayamukuta. Grant the loan for three months against indemnity bond to the value of Rs.500.

(d) Mrs. Roma Chaudhuri for the MS. of Vaidyanatha-prasada-prasasti. Grant the loan for three months against indemnity bond to the value of Rs.50.

(e) Mr. Ishwari Prasad, Allahabad University, for the MS. of Salatin-i-Afghana. Decline with explanation.

No. 12.

24-4-39.

Application for the loan of 'Sarboltasa Tantra' manuscript by Prof. Rashmohan Chakravarti, Comilla. Loan may be granted at a later date when the MS. is available.

No. 14.

29-5-39.

Letter from the Yale University asking to extend the period of loan of MS. No. 8728 (b) until the 1st October, 1939. Grant.

No. 25.

29-5-39.

Letter from Bhandarkar Oriental Research Institute, Poona, requesting extension of the period of loan of two manuscripts of 'Malati Madhava' which the Society issued on loan on 30-3-39. Extend.

No. 10.

31-7-39.

Application for loan of four Manuscripts of the Mahabharata by Mr. K. M. Sen, Principal, Vidyabhavana, Santiniketan, for collation purposes in connection with the publication of the Mahabharata by the Bhandarkar Research Institute, Poona.

Grant the loan of three MSS. of Mahabharata Santi Parva against indemnity bonds to the value of Rs.400, Rs.500 and Rs.425 respectively. The fourth MSS. which is old and damaged cannot be lent out but may be consulted in the Society's rooms or a photostat copy may be made at the borrower's expense.

No. 11.

31-7-39.

Application for an extension of the period of loan of two MSS. (Asvalayana Grihya Bhashya) from the Adyar Library, Madras. Grant.

No. 23.

31-7-39.

Application for an extension of loan of the MS. Vivarnaneyasangraha by the Registrar, University of Madras, for one month, and application for an extension of the period of loan of the Mahabharata MSS. by the Principal of the Viswabharati. Grant on the usual conditions.

No. 6.

28-8-39.

Letter from the Secretary, Yale University, requesting an extension of the period of the loan of MS. Sabha-Parvan until the 1st March, 1940. Grant.

No. 14.

28-8-39.

Letter from Dr. Ishwari Prasad, Allahabad, through Dr. M. N. Saha, asking for the loan of Ahmad Yadgar's Salatin-i-Afghana.

Resolved that he be informed that Salatin-i-Afghana has now been published by the Society and is available for purchase; that applications for the loan of MSS. are dealt with separately and that a separate indemnity bond is required to be executed for the loan of each MS. and that Dr. M. N. Saha be requested to ask him to become a member of the Society.

No. 17.

25-9-39.

Recommendation Library Committee No. 4 of 24-11-39. Request from the University of Madras for the loan of 2 MSS. 1. Nrisimhasarvasvakavya and 2. Kavindrakalpadruma. Lend against indemnity bond for Rs.300 and Rs.200 respectively. Accepted by Council.

No. 10.

30-11-39.

Recommendation Library Committee, No. 5 of 24-11-39. Request by Prof. Raghu Vira, Director, International Academy of Indian Culture, Lahore, for the loan of 5 MSS. of Caraka-samhita.

Postpone till next meeting. Accepted by Council.

No. 10.

30-11-39.

Recommendation Library Committee No. 1 of 12-12-39. Request of Prof. Raghu Vira, Director, International Academy of Indian Culture, Lahore, for the loan of 5 MSS. of Caraka-samhita. Lend two of the MSS. against indemnity bonds for the value of the MSS. selected. Accepted by Council.

No. 16.

12-12-39.

Recommendation Library Committee, No. 3 of 12-12-39. Request from the Principal, City College, Calcutta, for the loan of 16 MSS. from the Society's Library. The previous resolution of the Council of 27-4-1936 that '*residents of Calcutta* shall not except for very special reasons be permitted to borrow MSS. from the Society's Library but shall be permitted to consult them in the Society's premises' should be adhered to. Also resolved that the General Secretary take steps in consultation with Dr. J. N. Mukherjee and other members of the Council to have the Famulus Camera overhauled and put in order for copying work. Accepted by Council.

No. 16.

12-12-39.

Recommendation Library Committee No. 5 of 12-12-39. Request from Prof. S. K. Rahman for the loan of 4 MSS. of Kalimatush-Shuara.

The previous resolution of the Council of 27-4-36 that '*residents of Calcutta* shall not except for very special reasons be permitted to borrow MSS. from the Society's Library but shall be permitted to consult them in the Society's premises' should be adhered to. Accepted by Council.
No. 16. 12-12-39.

MANUSCRIPTS—

Report on MSS. lent out during the month. Record. Solicitor's letter to be sent to Dr. Ziauddin for not returning a valuable MS. belonging to the Society.

No. 7. 28-8-39.

Report of the General Secretary regarding the arrangements made for copying MSS. for: (1) The Editor, *Catalogus Catalogorum*, University of Madras, and (2) the Curator, Bhandarkar Institute, Poona. Record.
No. 16. 28-8-39.

Recommendation Library Committee No. 2 of 18-9-39. On the motion of Prof. Mahfuz-ul Haq seconded by Dr. M. Hidayat Hosain it was unanimously resolved that a sub-committee consisting of Dr. Baini Prashad, Dr. M. Hidayat Hosain, and the Honorary General Secretary be appointed for consideration of the purchase of Persian and Arabic Manuscripts. Accepted by Council.

No. 12. 25-9-39.

MEDALS—

Letter of thanks from Dr. J. H. Hutton for the award to him of the Annandale Memorial Medal. Record.

No. 1. 30-1-39.

Letter of thanks from Dr. A. J. Wensinck. Record.

No. 3. 27-2-39.

Letter of thanks from Dr. Baini Prashad. Record.

No. 5. 27-2-39.

Letter of thanks from Sir David Prain. Record.

No. 1. 24-4-39.

Letter of thanks from Prof. D. Herelle for the award to him of the Sir William Jones Memorial Medal. Record.

No. 3. 24-4-39.

Suggested design for the die for the Indian Science Congress (Calcutta) Medal, submitted to the Council, R.A.S.B., for consideration. Call for other designs.

No. 25. 31-7-39.

Appointment of Advisory Boards for the awards of:

(a) Annandale Memorial Medal.

The Board to consist of Rai Bahadur R. P. Chanda, J. P. Mills and the Ex-officio members (Anthropological Secretary, Biological Secretary, Medical Secretary and the General Secretary).

(b) Barclay Memorial Medal.

The Board to consist of Bt.-Col. R. N. Chopra, Dr. Bidhan Chandra Roy and the Ex-officio members (Biological Secretary, Medical Secretary and the General Secretary).

No. 17. 30-11-39.

Recommendation of the Barclay Memorial Medal Advisory Board.
Accept the Board's recommendation: Major-General Sir R. McCarrison.
No. 12. 12-12-39.

Recommendation of Annandale Memorial Medal Advisory Board.
Accept the Board's recommendation: Dr. Frank Weidenreich.
No. 13. 12-12-39.

MEDICAL SECTION—

Resolved that Col. R. N. Chopra, Sir U. N. Brahmachari and Major C. L. Pasricha be invited kindly to put up proposals before the Council with regard to the resuscitation of the Society's Medical Section.
No. 19. 24-4-39.

Minutes of the Medical Sub-Committee Meeting of 17-7-39, forwarded by the Medical Secretary, R.A.S.B., for consideration of the Council.
Accept.
No. 24. 31-7-39.

MEMBERSHIP—

List of members, corrected to the close of 1938, for submission to the Ordinary Annual Meeting. Member list to be submitted.
No. 2. (Special.) 6-2-39.

Recommendation Finance Committee No. 6 of 27-2-39. List of members in arrears with subscriptions for removal under Rule 38. Apply rules. Accepted by Council.
No. 11. 27-2-39.

Resignations. Resolved that resignations should be reported to the Council together with the reasons given therefor.
No. 9. 20-3-39.

Resolved that the General Secretary do report on the resignation of membership of Mr. P. Acharya to the Council through the Special Enquiry Committee together with their comments thereon. That the General Secretary should write a suitable letter of regret to Mr. Acharya explaining that the Council is looking into the cause of the mistake and asking him to withdraw his resignation.

The General Secretary also to return the paper under discussion to Mr. P. Acharya.
No. 10. 20-3-39.

Note concerning subscription being paid by 4 members at Non-Resident rate although Resident Members. Acting General Secretary to take action.
No. 21. 29-5-39.

Note concerning Count Kozui Ohtani. Removal under Rule 38 to be rescinded. Acting General Secretary to address Count Ohtani suitably.
No. 22. 29-5-39.

Report of the General Secretary on the membership of Count Ohtani. Resolved that he be made a life member.
No. 18. 28-8-39.

Letter from Mr. H. C. Mandhata explaining his position in regard to non-payment of subscription and requesting the Society to take a liberal view in his case owing to his financial difficulties. General Secretary to decide.

No. 5.

30-11-39.

MEETINGS—

Correspondence with Mr. C. C. Das-Gupta. Council meeting cannot be pushed forward but attempts should be made to arrange monthly meeting programmes one month earlier.

No. 13.

28-8-39.

Ordinary Monthly Meeting during recess months.

Resolved that the next Monthly Ordinary General Meeting be held in November 1939.

No. 20.

25-9-39.

MISCELLANEOUS—

Abstract of proceedings of the Council for 1938, for inclusion in the Annual Report [Rule 48(b)]. Abstract to be included.

No. 1. (Special.)

6-2-39.

Letter from Dr. S. L. Hora. The General Secretary to circulate a note to the Council.

No. 9.

27-2-39.

Letter from the President, 3rd Session, Kuki Association Conference. Refer to Dr. Hutton for an expression of opinion to be placed before the Council.

No. 15.

27-2-39.

Reply from Dr. J. H. Hutton with regard to a protest by the Kuki Association. Accept Dr. Hutton's draft and forward it to the President of the Kuki Association; also resolved to convey the thanks of the Society to Dr. Hutton for the kind services rendered by him.

No. 8.

24-4-39.

Letter from Mr. N. D. Dandawati regarding the publication of certain Sanskrit Manuscripts belonging to him. Accept the suggestion of Prof. Chintaharan Chakravarti.

No. 9.

24-4-39.

Letter from Dr. S. L. Hora together with a note by the General Secretary.

Resolved that a letter be drafted to Dr. Hora and forwarded after approval by the President and Sir John Lort-Williams under the signature of the President stating that the Council decided to take no notice of the article in the Modern Review because it was an anonymous communication but that the points raised by Dr. Hora in his letter have been carefully considered by the Council, and most of them have been referred to a Special Enquiry Committee which is still considering what action should be taken.

The Council, however, takes strong exception to Dr. Hora's suggestion that the administration of the Society is guilty of malpractices, and unless Dr. Hora withdraws this expression unreservedly the Council will take such action as their legal advisers may suggest.

No. 13.

24-4-39.

Letter from the Director of Indic Studies, Library of Washington, concerning the establishment of a department of Indic Studies and requesting the Society to publish a notice thereof in the Society's 'Journal'. Approve the action taken by the Acting General Secretary.
No. 5. 29-5-39.

Letter from the Honorary Secretary, Indian Society of Pathology and Microbiology, enquiring whether the Society would sponsor his organisation.

Ask the Society to forward details of the ways in which the Society can sponsor it.

No. 8. 29-5-39.

Correspondence concerning cessation of excavations at Mohenjo Daro. Acting General Secretary to consult the Director Archaeological Survey of India and other experts and to submit a draft reply to the next Council meeting.

No. 20. 29-5-39.

On the proposal of the Maharajadhiraja of Burdwan it was resolved that the Special Enquiry Committee should consider and make recommendations on the feasibility of selling some of the Society's Oil Paintings to provide funds for the renovation and preservation of the Library and other valuable possessions.

No. 26. 29-5-39.

Recommendation Finance Committee No. 4 of 26-6-39. Letter dated the 24th May, 1939 from the R.A.S., North China Branch, asking for a contribution. Send Rs.100 with a letter couched in suitable terms. Accepted by Council.

No. 5. 26-6-39.

Correspondence with Dr. Clement C. J. Webb regarding the presentation to the Society of an original letter from James Princep to the Rev. W. H. Mill, D.D. Record.

No. 11. 26-6-39.

Letter from the South Indian National Association and Ranade Library Madras. Accept General Secretary's suggestion.

No. 1. 31-7-39.

Correspondence with the Director-General of Archaeology in India.

The General Secretary to address the Government of India on the subject.

No. 6. 31-7-39.

Correspondence with Sir U. N. Brahmachari. Action being taken. Record.

No. 18. 31-7-39.

Mr. Mahfuz-ul Haq withdrew the suggestion made by him in paragraph 1 of his letter dated the 8th August, 1939 in respect of an allowance to Maulvi S. M. Ahmed. It was resolved to refer the suggestions made in paragraphs 2, 3 and 4 of that letter to the Publication Committee and the suggestions made in paragraphs 5 and 6 to the Finance Committee.

No. 3. (Special.) 10-8-39.

Report on the Society's collection of coins and gems. Rai Durga Prasad and Mr. Ramachandran to be asked to submit a preliminary report.

No. 3.

28-8-39.

Recommendation Publication Committee No. 1 of 21-8-39. Correspondence and cuttings from newspapers and leaflets regarding financial assistance for publishing Sanskrit works on the 'Game of Chess' by Mr. Kulkarni Haldikar. Accept the Philological Secretary's recommendation. Accepted by Council.

No. 10.

28-8-39.

To decide on the action to be taken by the Society in regard to the present emergency. On the motion of Sir David Ezra seconded by Col. R. N. Chopra it was unanimously resolved that the President and Council of the Royal Asiatic Society of Bengal, Calcutta, do offer to the Government of India and the Government of Bengal the loyal services of the Society in the present war. The General Secretary was directed to forward a copy of this resolution by post to the Private Secretaries to His Excellency the Viceroy and Governor-General and to His Excellency the Governor of Bengal, respectively, and to the former also by telegram.

No. 1. (Special.)

11-9-39.

Letter of thanks from the President and the Secretary, Royal Asiatic Society, North China Branch, for a donation of Rs.100 made by the R.A.S.B. to the building fund of the Society. Record.

No. 3.

25-9-39.

Correspondence with Mr. T. N. Ramachandran, Offg. Superintendent, Archaeological Survey of India, Calcutta, regarding the collection of coins and gems of the Society, as well as the copper-plate inscriptions. Correspondence with Rai Durga Prasad, Benares, on the same subject.

Resolved that Mr. Ramachandran be asked to examine and report on the gems and coins. Further resolved that the copper-plate inscriptions cannot be sent out of the Society.

No. 4.

25-9-39.

Letter from the Secretary, Indian History Congress, 1939, Calcutta, asking the Society to place some of the coins, paintings, old records, etc. belonging to the Society at his disposal for exhibition at the Congress.

Resolved that all publications issued by the Society be lent for the exhibition. Further resolved that the delegates to the Indian History Congress be invited to visit and inspect the Society's possessions.

No. 7.

25-9-39.

Correspondence with the Private Secretary to His Excellency the Viceroy in respect of the resolution passed by the Council in its Special Meeting on the 11th September, 1939. Record.

No. 18.

25-9-39.

Correspondence with the Secretary to His Excellency the Governor of Bengal in regard to the resolution passed by the Council at the Special Meeting on the 11th September, 1939. Record.

No. 19.

25-9-39.

Letter of thanks from Dr. A. W. Pavlov, Moscow, for the congratulations of the Society on the occasion of his 70th birthday. Record.

No. 8.

30-11-39.

ORDINARY FELLOWS—

Recommendation of the meeting of Resident Fellows on 6-1-39.
 Accept.
 No. 9. " 30-1-39.

Letters of thanks from Drs. C. S. Fox and B. S. Guha. Record.
 No. 4. 27-2-39.

Resolution passed by the Resident Fellows at their meeting on the 26th September, 1938, regarding the position of Fellows with regard to nomination for the award of medals.

Refer to the Special Enquiry Committee as the revision of regulations is also involved.
 No. 9. " 26-6-39.

Recommendations of the Special Meeting of the Resident Fellows of the Society held on the 14th August, 1939. Accept.
 No. 4. 28-8-39.

PATRON—

Letter dated 25-11-39 from the Assistant Secretary to His Excellency the Governor of Bengal intimating the acceptance by His Excellency of the Joint Patronage of the Society. Record. The word 'joint' to be omitted.
 No. 6. 12-12-39.

PROVIDENT FUND—

Recommendation Finance Committee No. 3 (c) of 17-3-39. Re-investment of the discharge value of Rs.6,000 of six Postal Cash Certificates of Rs.1,000 each belonging to the Provident Fund of the Society. Invest in Fixed Deposit with the Imperial Bank of India, Park Street Branch, for 12 months. Accepted by Council.
 No. 5. 20-3-39.

Recommendation Finance Committee No. 3 (b) of 29-5-39. Application from Cashier for a loan of Rs.400 from the Provident Fund. Grant loan of Rs.400 bearing interest at the rate of 3% per annum repayable by monthly instalments of Rs.20 each. Accepted by Council.
 No. 15. 29-5-39.

Recommendation Finance Committee No. 2 (d) of 26-6-39. Application of Mr. N. Gupta, for a loan of Rs.195 from the Provident Fund. That the loan of Rs.195 be granted. The outstanding balance of the existing loan to be recovered from the amount now recommended. The loan to bear interest at 3% per annum and to be recovered in monthly instalments of Rs.10. Accepted by Council.
 No. 5. 26-6-39.

Recommendation Finance Committee No. 4 (a) of 28-8-39. Payment to Babu B. L. Dutt, retiring Librarian, of Rs.4,534-8-8 being the total amount standing to his credit in the Provident Fund Account of the Society, as at the end of August, 1939. Put up to Council. Council order: Pay B. L. Dutt's provident fund and gratuity.
 No. 8. 28-8-39.

Recommendation Finance Committee No. 4 (c) of 28-8-39. Application dated 18-8-39 from John Robert Seal, Esq., Asst. Secy., for joining the Provident Fund of the Society. Permit. Accepted by Council.

No. 8. 28-8-39.

Recommendation Finance Committee No. 4 (e) of 28-8-39. Application dated 15-8-39 from Press Clerk for a loan of Rs.400 from the Provident Fund. Put up at the next meeting as necessary details are not before the Committee. Accepted by Council.

No. 8. 28-8-39.

Application from Mr. P. O. Matthai for a loan of Rs.600 from the Provident Fund. Record.

No. 1. 25-9-39.

Recommendation Finance Committee No. 3 (a) of 18-9-39. Application dated 15-8-39 from Press Clerk for a loan of Rs.400 from the Provident Fund. Grant on the usual terms. Accepted by Council.

No. 14. 25-9-39.

Recommendation Finance Committee No. 4 of 18-9-39. Loan to Mr. P. O. Matthai of Rs.600 from the Provident Fund on the usual terms. Record. Accepted by Council.

No. 14. 25-9-39.

Recommendation Finance Committee No. 16 of 24-11-39. Application from Mr. S. K. Raye for a loan of Rs.250 from the Provident Fund. Grant a loan of Rs.250 bearing interest at 3% per annum, repayable by monthly instalments of Rs.15. Accepted by Council.

No. 9. 30-11-39.

Recommendation Finance Committee No. 2 (a) of 7-12-39. Society's contribution to the Provident Fund for 1939. Rs.701-1-9. Transfer. Accepted by Council.

No. 15. 12-12-39.

Recommendation Finance Committee No. 7 of 7-12-39. Application dated 7-12-39 from Mr. N. Gupta for an advance of Rs.25 from his December salary. Decline, but grant an advance of Rs.25 from the Provident Fund to be repaid as the General Secretary may direct. Accepted by Council.

No. 15. 12-12-39.

PUBLICATIONS—

Correspondence with the B. M. Press concerning the printing of arrears of publications. The Special Enquiry Committee to make recommendations, after obtaining the views of the General Secretary (on special duty).

No. 11. 25-9-39.

Letter from the All-India Industrial Exhibition, Quetta, asking for permission to publish J. F. Garwood's paper 'Ancient Mounds in the Quetta District', in their Guide Book. Grant. The usual acknowledgment to be made.

No. 24. 29-5-39.

Recommendation Finance Committee No. 5 of 26-6-39. Request from Mr. D. S. Wells asking whether any remuneration can be given to Rev. J. L. Wenger for correcting proofs of the Lushai Dictionary.

Decline. Request the author to correct the proofs and incidental expenses only should be paid. Accepted by Council.

No. 5.

26-6-39.

Letter from Mr. C. Chakravarti of 21-7-39. Permission of the Society must be obtained for the publication of any extracts from our translations of MSS. borrowed from the Society. When material other than extracts or translations obtained from MSS. loaned by the Society is made use of by the borrowers in any paper or publication issued by them, a simple acknowledgment in the work of the source of the material used will suffice.

No. 22.

31-7-39.

Letter from Dr. K. P. Biswas. Refer the first part to the Publication Committee. No publication of epitomes in daily, weekly or monthly Journals.

No. 12.

28-8-39.

Recommendation Publication Committee No. 1 of 18-9-39. Letter from Dr. K. P. Biswas dated 23rd August, 1939. (1) Resolved that the thanks of the Committee be conveyed to Dr. K. P. Biswas for his suggestions. (2) Summaries of discussions at General Meetings to be incorporated in Advance Proceedings, the issue of which, it is hoped, will recommence from 1940. Accepted by Council.

No. 13.

25-9-39.

Recommendation Publication Committee No. 4 of 24-11-39. Application from Prof. Chintaharan Chakravarti for inserting his name on the cover of the 'Descriptive Catalogue of Sanskrit MSS.' Volume VIII, along with the name of MM. H. P. Shastri. Agree. His name should appear on both the cover and the Title-page. Accepted by Council.

No. 12.

30-11-39.

Recommendation Publication Committee No. 1 of 12-12-39. Revision of the Sanskrit portion of the 'Mahavyutpatti' by Alexander Csoma de Körös. Prof. D. Chattopadhyaya of Bethune College to edit the work at the usual remuneration of Rs.1-8-0 per page. Accepted by Council.

No. 17.

12-12-39.

Recommendation Publication Committee No. 7 of 12-12-39. Letter dated 12-12-39 from B. M. Press regarding the supply of blue cover boards for the Society's publications. General Secretary to decide on a suitable cheap cover in consultation with the Baptist Mission Press. Accepted by Council.

No. 17.

12-12-39.

REPRESENTATION—

Representation of the Society at the Tenth All-India Oriental Conference, December, 1939. Bring up in the July meeting.

No. 2.

20-3-39.

Representation on the Selection Committee, Kamala Lectureship, Calcutta University. The Society's representative to be Dr. Baini Prashad.

No. 10.

29-5-39.

Letter from Prof. Sten Konow with reference to the Society's request to him to represent the Society at the bicentenary celebration of the

Royal Swedish Academy at Stockholm. Decline with regret. No precedence.

No. 3.

26-6-39.

Letter from the Registrar, Calcutta University, requesting the Council of the Society to nominate an expert in Anthropology to serve as a member of the Selection Committee for the appointment of a University Professor of Anthropology.

On the proposal of Mr. H. C. Chakladar seconded by Mr. Mahfuz-ul Haq it was resolved that Dr. B. S. Guha be nominated as the Society's representative. If, however, Dr. B. S. Guha has been nominated by any other body, then Rai Bahadur R. P. Chanda to be the Society's nominee.

No. 5.

31-7-39.

Letter from Sir Thomas Holland of 19-6-39, intimating his inability to represent the Society at the International Congress of Genetics at Edinburgh in August, 1939, as he would be out of Scotland at that time. Record.

No. 20.

31-7-39.

REQUESTS—

Request from the Curator, Natural History Museum, Darjeeling, for permission to publish an abridged account of the article 'Fishes of Northern Bengal' published in the Society's Journal.

Observe the practice that no reprints of articles published in the Society's Journal be allowed within a date three years from date of publication. Allow the publication of an abstract of the paper, but not of any plate before that date. Draw the attention of the applicant to the availability for sale of copies of full reprints of the article.

No. 17.

30-1-39.

Recommendation Library Committee No. 3 of 27-2-39. Letter from the Mysore University requesting free supply of the Society's Catalogues of books and Manuscripts. The Society's Catalogue of Sanskrit MSS. may be given free to the University of Mysore. Accepted by Council.

No. 13.

27-2-39.

Recommendation Library Committee No. 4 of 27-2-39. Request for presentation of 'A Descriptive Catalogue of Sanskrit MSS.' in the collection of the Asiatic Society of Bengal by MM. Haraprasad Shastri, Vol. I, and following, from Universitets Bibliotheket, Lund. Exchange. Accepted by Council.

No. 13.

27-2-39.

Recommendation Library Committee No. 12 of 27-2-39. Letter from 'Chemisches Zentralblatt' requesting free supply of the Society's publications. Decline. Accepted by Council.

No. 13.

27-2-39.

Request for a free supply of the Society's publications by the South Indian National Association and Ranade Library, Madras. Postpone. Send the file to Dr. S. P. Mookerjee.

No. 9.

29-5-39.

Request from Dr. M. N. Saha for permission to publish a photographic copy of Princep's letter to Mill in 'Science and Culture'. Grant.

No. 12.

26-6-39.

Letter from Cambridge Philosophical Society, Cambridge, requesting presentation of parts 4-6 of the Memoirs of the Society, 'Geographic and Oceanographic Research in Indian Waters' by Col. Sewell. Present.
No. 3. 31-7-39.

Appeal for financial help from the Bishop of Hongkong for the Foreign Auxiliary to the National Red Cross Society of China. Resolved that a reply expressing the sympathy of the Society be sent.
No. 2. 25-9-39.

Request from Dr. R. C. Majumdar to take a photographic copy of two pages of MS. No. 3078, Ramacharita, for a new edition of that particular work. No action.
No. 4. 30-11-39.

Letter dated 23-11-39 from the editor of the Catalogus Catalogorum, Madras, requesting either presentation, loan or purchase of H. P. Shastri: Notices Pt. IV, Nepal Catalogue, Vol. II and Last Report 1906-11. Present.
No. 8. 12-12-39.

STAFF—

Recommendation Finance Committee No. 4 of 30-1-39. The annual increment to the staff. Increment to be given to those who are on scale. The Asst. Secretary's case to be considered after confirmation. Accepted by Council.
No. 10. 30-1-39.

Recommendation Finance Committee No. 3 of 24-4-39. Application for increment of salary from Pt. B. B. Mukherjee. Confirm, put on grade, Rs.50-3-80, and give Rs.6 increment (two increments of Rs.3) from the current month (1st April).
No. 14. 24-4-39.

Recommendation Finance Committee No. 4 of 24-4-39. Application for pay for the period of sickness by Chaprassi, Ram Dhyan Singh. Give one month's leave without pay and equivalent of one month's pay as compassionate allowance. Accepted by Council.
No. 14. 24-4-39.

Recommendation Finance Committee No. 3(a) of 29-5-39. Application dated 5-5-39 from Chaprassi, Rajpati Ojha, for loan of Rs.50 from the Society. Decline. Accepted by Council.
No. 15. 29-5-39.

Application from Trin Chen for employment by the Society for cataloguing the Tibetan manuscripts of the Society. Appoint.
No. 4. 31-7-39.

Recommendation Finance Committee No. 4(b) of 28-8-39. Payment to Babu B. L. Dutt, retiring Librarian, of Rs.1,050 being the amount of gratuity (6 months' pay) granted to him in terms of the report of the Special Enquiry Committee. Put up to Council. Council order: Pay B. L. Dutt's provident fund and gratuity.
No. 8. 28-8-39.

Recommendation Finance Committee No. 6 of 28-8-39. Application from Mr. J. R. Seal, Asst. Secretary, for an advance of salary. Circulate. Accepted by Council.

No. 8.

28-8-39.

Recommendation Finance Committee No. 3(b) of 18-9-39. Application from Mr. J. R. Seal, Asst. Secretary, for an advance of Rs.800 from the Society. Grant as a very special case without prejudice and without establishment of any precedent. Accepted by Council.

No. 14.

25-9-39.

Contract form of appointment and termination of services of Mr. J. R. Seal, Asst. Secretary, R.A.S.B. Accept as amended.

No. 1.

30-11-39.

Recommendation Finance Committee No. 4 of 5-10-39. Application from Inayat Karim for a pension. Put up at the next meeting with a further report. Accepted by Council.

No. 9.

30-11-39.

Recommendation Finance Committee No. 2(b) of 24-11-39. Application, dated 30-10-39 from office duffry, Sheikh Chunnu, for a loan of Rs.30. Grant a loan of Rs.30 repayable by monthly instalments of Rs.2. Accepted by Council.

No. 9.

30-11-39.

Recommendation Finance Committee No. 12 of 24-11-39. Consideration of application from Inayat Karim for a pension (postponed from the previous meeting Item No. 4). Grant a gratuity of Rs.25. Accepted by Council.

No. 9.

30-11-39.

Amended form of contract appointment and termination of services of Mr. J. R. Seal, Assistant Secretary, R.A.S.B.

Accept Sir John Lort-William's suggestion.

No. 9.

12-12-39.

Recommendation Finance Committee No. 2(c) of 7-12-39. Annual increment of salaries to staff. Grant as recommended by the Special Enquiry Committee. Accepted by Council.

No. 15.

12-12-39.

Recommendation Finance Committee No. 8 of 7-12-39. Temporary engagement of 4 additional bearers for the clearing of stock rooms, library and office, removal of wooden furniture and replacement of stock and library books until the 31st January, 1940. Engage additional bearers up to 4 in number on daily wages up to the 31st January, 1940, or such earlier date as they may actually be required. Accepted by Council.

No. 15.

12-12-39.

STEEL SHELVING—

Recommendation Finance Committee No. 3(d) of 27-7-39. Estimate for steel shelving. That the estimate of Messrs. Bungo Steel Furniture, Ltd., being the lowest, be recommended to the Council for acceptance. Accepted by Council.

No. 13.

31-7-39.

Letter from Bungo Steel Furniture, Ltd., regarding the difference of prices of steel goods owing to the state of emergency which has arisen since the estimates for steel racks, etc., was submitted. Further letter, dated 22nd September on the same subject.

Resolved that an increase of 10% on the estimate be allowed.

No. 6.

25-9-39.

VISIT—

Letter dated 18-11-39 from the Secretary, Indian Historical Records Commission, in connection with the proposed visit of the members of the Commission to the Society during the forthcoming session at Calcutta.

Approve.

No. 1.

12-12-39.

**List of
Patrons,
Officers, Council Members, Members,
Fellows, and Medallists
of the
Royal Asiatic Society of Bengal,
On the 31st December, 1939.**

PATRONS OF THE ROYAL ASIATIC SOCIETY OF BENGAL.

1936 ..	.. H.E. the Most Honourable Lord Victor Alexander John Hope, K.T., P.C., G.M.S.I., G.M.I.E., G.C.I.E., D.L., T.D., the Marquess of Linlithgow, Viceroy and Governor- General of India.
1939 ..	.. H.E. Sir John Arthur Herbert, G.C.I.E., Governor of Bengal.
1910-1916	.. Lord Hardinge of Penshurst, K.G., P.C., G.C.B., G.C.M.G., G.C.S.I., G.C.I.E., G.C.V.O., I.S.O.
1917-1922	.. The Most Hon. the Marquess of Zetland, P.C., G.C.S.I., G.C.I.E.
1922-1927	... The Right Hon. the Earl of Lytton, P.C., G.C.S.I., G.C.I.E.
1926-1931	.. The Right Hon. the Viscount Halifax, K.G., P.C., G.C.S.I., G.C.I.E.
1927-1932	.. Colonel Sir Francis Stanley Jackson, P.C., G.C.I.E.
1931-1936	.. The Right Hon. the Earl of Willingdon, G.M.S.I., G.C.M.G., G.M.I.E., G.B.E.
1932-1938	.. The Right Honourable Sir John Anderson, P.C., G.C.B., G.C.I.E.

OFFICERS AND MEMBERS OF COUNCIL OF THE ROYAL ASIATIC SOCIETY OF BENGAL DURING THE YEAR 1939.

Elections Annual Meeting.

President.

Sir David Ezra, Kt., F.Z.S., M.B.O.U.

Vice-Presidents.

Lt.-Col. N. Barwell, M.C., M.A., Barrister-at-Law.
Bt.-Col. R. N. Chopra, C.I.E., M.A., M.D., Sc.D., I.M.S., F.N.I., F.R.A.S.B.
The Hon'ble Mr. Justice John Lort-Williams, Kt., K.C.
Sir Bijay Chand Mahtab, G.C.I.E., K.C.S.I., I.O.M., Maharajadhiraja
Bahadur of Burdwan.

Secretaries and Treasurer.

General Secretary:—Johan van Manen, Esq., C.I.E., F.R.A.S.B.
Treasurer:—Percy Brown, Esq., A.R.C.A., F.R.A.S.B.
Philological Secretary:—S. K. Chatterji, Esq., M.A., D.Lit., F.R.A.S.B.
Joint Philological Secretary:—Shamsu'l 'Ulama Mawlawi M. Hidayat
Hosain, Khan Bahadur, Ph.D., F.R.A.S.B.
Natural History Secretaries { Biology:—Baini Prashad, Esq., D.Sc., F.Z.S., F.R.S.E.,
F.N.I., F.R.A.S.B.
Physical Science:—J. N. Mukherjee, Esq., D.Sc.,
F.C.S., F.N.I., F.R.A.S.B.
Anthropological Secretary:—B. S. Guha, Esq., M.A., Ph.D., F.N.I.,
F.R.A.S.B.
Medical Secretary:—Rai Sir Upendra Nath Brahmachari Bahadur, Kt.,
M.A., M.D., Ph.D., F.S.M.F., F.N.I., F.R.A.S.B.
Library Secretary:—M. Mahfuz-ul Haq, Esq., M.A.

Other Members of Council.

Major C. L. Pasricha, M.A., M.B., B.Ch., M.R.C.S., I.M.S.
Kalipada Biswas, Esq., M.A., D.Sc., F.R.S.E.
C. S. Fox, Esq., D.Sc., M.I.Min.E., F.G.S., F.N.I., F.R.A.S.B.
Syamaprasad Mookerjee, Esq., M.A., B.L., D.Litt., Barrister-at-Law.
Satya Churn Law, Esq., M.A., B.L., Ph.D., F.N.I., F.Z.S., M.B.O.U.
Meghnad Saha, Esq., D.Sc., F.R.S., F.N.I., F.R.A.S.B.

APPOINTMENTS, TRANSFERS, AND OTHER CHANGES DURING THE YEAR.

Dr. B. S. Guha, Acting General Secretary, *vice* Mr. Johan van Manen,
General Secretary on special duty from 25-4-39 to 1-7-39.
Dr. B. S. Guha, General Secretary, *vice* Mr. Johan van Manen, resigned
with effect from 1st July.
Dr. B. S. Guha, Acting Honorary Treasurer, *vice* Mr. Percy Brown,
absent from 1-4-39 to 25-4-39.
Dr. Baini Prashad, Acting Honorary Treasurer, *vice* Mr. Percy Brown,
absent from 25-4-39 to 1-10-39.
Mr. H. C. Chakladar, Anthropological Secretary, *vice* Dr. B. S. Guha,
resigned with effect from 1st July.
Maharajadhiraja of Burdwan, absent from June to first week of October.
Sir John Lort-Williams, absent from August to beginning of December.
Lt.-Col. N. Barwell, absent from August to November.
Dr. J. N. Mukherjee, absent from 10-5-39 to 15-6-39.
Sir U. N. Brahmachari, absent from 15-5-39 to 24-6-39.

**OFFICERS AND MEMBERS OF COUNCIL OF THE
ROYAL ASIATIC SOCIETY OF BENGAL
ELECTED FOR THE YEAR 1940.**

President.

The Hon'ble Mr. Justice John Lort-Williams, Kt., K.C.

Vice-Presidents.

Bt.-Col. R. N. Chopra, C.I.E., M.A., Sc.D., M.D., F.R.C.P.,
F.N.I., F.R.A.S.B., I.M.S.
Sir Bijay Chand Mahtab, G.C.I.E., K.C.S.I., I.O.M., Maharaja-
dhiraja Bahadur of Burdwan.
C. S. Fox, Esq., D.Sc., M.I.Min.E., F.G.S., F.N.I., F.R.A.S.B.
Syamaprasad Mookerjee, Esq., M.A., B.L., D.Litt., Barrister-at-
Law.

Secretaries and Treasurer.

General Secretary:—B. S. Guha, Esq., M.A., Ph.D., F.N.I.,
F.R.A.S.B.
Treasurer:—Baini Prashad, Esq., D.Sc., F.Z.S., F.R.S.E., F.N.I.,
F.R.A.S.B.
Philological Secretary:—S. K. Chatterji, Esq., M.A., D.Litt.,
F.R.A.S.B.
Joint Philological Secretary:—M. Mahfuz-ul Haq, Esq., M.A.
Natural History { Biology:—Kalipada Biswas, Esq., M.A.,
D.Sc., F.R.S.E.
Secretaries:— { Physical Science:—Meghnad Saha, Esq.,
D.Sc., F.R.S., F.N.I., F.R.A.S.B.
Anthropological Secretary:—H. C. Chakladar, Esq., M.A.
Medical Secretary:—Major C. L. Pasricha, M.A., M.B., B.Ch.,
M.R.C.S., F.N.I., I.M.S.
Library Secretary:—J. N. Mukherjee, Esq., D.Sc., F.C.S., F.N.I.,
F.R.A.S.B.

Other Members of Council.

Percy Brown, Esq., A.R.C.A., F.R.A.S.B.
S. C. Law, Esq., M.A., B.L., Ph.D., F.Z.S., M.B.O.U., F.N.I.
Kalidas Nag, Esq., M.A., D.Litt.
Sir S. Radhakrishnan, Kt., M.A., D.Litt., F.B.A.
M. Z. Siddiqi, Esq., M.A., Ph.D.
W. D. West, Esq., M.A., F.N.I.

ORDINARY MEMBERS.

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R=Resident. N=Non-Resident. F=Foreign. A=Absent. L=Life.

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An Asterisk is prefixed to names of Ordinary Fellows of the Society.

Date of Election.		
5-4-22	R	Abdul Ali , ABUL FAIZ MUHAMMAD, M.A., M.R.A.S., F.R.S.L., F.R.G.S., F.R.H.S. 3, Nawab Abdur Rahman Street, Calcutta.
7-3-27	N	Abdul Kadir , A. F. M., M.A. (ALLAHABAD), MAULVIE FAZIL (PUNJAB), MADRASSAH FINAL (CALCUTTA), <i>Professor, Rajshahi College.</i> Rajshahi.
2-11-25	N	Acharya , PARAMANANDA. B.SC.. <i>State Archæologist,</i> Mayurbhanj State, Baripada.
2-3-21	R	Agharkar , SHANKAR PURUSHOTTAM, M.A., PH.D., F.L.S., F.N.I., <i>Sir Rash Behari Ghose Professor of Botany, Calcutta University.</i> 35, Ballygunge Circular Road, Calcutta.
3-2-36	N	Ahmad , ALFAZUDDIN, KHAN BAHADUR. <i>Late Offg. Assistant Director of Public Instruction for Muhammedan Education, Bengal.</i> Dhalhora, Tamluk, Midnapur.
1-1-34	N	Ahmad , MIAN JAMAL-UD-DIN, B.A., B.T., <i>Member, Bureau of Education, Afghanistan.</i> 2, Andrabi, Kabul, Afghanistan.
6-6-17	N	Aiyangar , K. V. RANGASWAMI, RAO BAHADUR, M.A., <i>Late Director of Public Instruction, Travancore.</i> Vasumali Vilas, Rangaswami Road, Mylapore, Madras.
6-12-26	N	*Aiyangar , S. KRISHNASWAMI, M.A., PH.D., M.R.A.S., F.R.HIST.S., F.R.A.S.B., <i>Rajasevasakta, Professor, University of Madras.</i> 'Sripadam', 143, Brodies Road, Mylapore, Madras, S.
1-12-20	N	Akbar Khan , THE HON'BLE MAJOR NAWAB SIR MOHAMMED, K.B.E., C.I.E., <i>Khan of Hoti.</i> Hoti, N.-W.F.P.
5-6-39	R	Ali , S. SHAMSER, <i>Insurance Underwriter.</i> 3, Bright Street, Ballygunge, Calcutta.
4-4-38	R	Anderson , J. 15, Park Street, Calcutta.
3-7-12	F	Andrews , EGBERT ARTHUR, B.A. c/o The Royal Empire Society, Northumberland Avenue, London, W.C.
5-4-37	R	Asari , J. R., <i>Retd. Asstt. Controller of Printing, Stationery and Stamps.</i> Suite 10, 23, Central Avenue, Calcutta.
3-3-30	L	Ashton , HUBERT SHORROCK, <i>Merchant.</i> Trueloves, Ingatestone, Essex, England.
3-9-34	R	Auden , JOHN BICKNELL, M.A. (CANTAB.), F.G.S., F.N.I., <i>Assistant Superintendent, Geological Survey of India.</i> 27, Chowringhee, Calcutta.
3-11-30	R	Austin , GEORGE JOHN, <i>Sanitary Engineer, Messrs. J. B. Norton & Sons, Ltd.</i> Norton Building, Lalbazar, Calcutta.
4-4-17	N	Awati , P. R., B.A. (CANTAB.), D.I.C., F.N.I., I.E.S., <i>Professor of Zoology, Royal Institute of Science.</i> Mayo Road, Fort, Bombay.
1-5-39	R	Ayrton , SHAVUX MUNCHERSHAW, <i>Assistant, Messrs. Shaw Wallace & Co.,</i> Madon Mansions, 275-C, Bow Bazar Street, Calcutta.

Date of Election.		
3-3-14	L	* Bacot , J., F.R.A.S.B. Boulevard Saint-Antoine, 61, Versailles Seine-et-Oise, France.
7-9-36	R	Bagchi , K. N., RAI BAHADUR, B.SC., M.B. (CAL.), F.I.C. (LOND.), D.T.M. (CAL. & L'POOL), <i>Chemical Examiner to the Government of Bengal</i> . Medical College, Calcutta.
1-11-26	R	Bagchi , PROBODH CHANDRA, M.A., DR.-ES-LETTERS (PARIS), <i>Member of the A.S. of Paris; Lecturer, Calcutta University</i> . 9, Rustomjee Street, Ballygunge, Calcutta.
1-3-26	R	Bagnall , JOHN FREDERICK, B.SC., A.M.I.MECH.E., A.M.I.E.E., A.M.INST.C.E., <i>Consulting Engineer, Messrs. Macnill & Co.</i> 2, Fairlie Place, Calcutta.
2-4-24	N	* Bahl , K. N., D.SC., D.PHIL., F.N.I., F.R.A.S.B., <i>Professor of Zoology, Lucknow University</i> . Badshabagh, Lucknow.
7-3-27	N	Bake , A. A., <i>Doctorandus Or. Lit.</i> c/o Netherland Indies Commercial Bank, 1, Royal Exchange Place East, Calcutta.
1-8-38	R	Banerjee , J. N., M.A., <i>Lecturer, Calcutta University</i> . 28, Manoharpukur Road, Calcutta.
6-2-18	N	Banerjee , NARENDRA NATH, M.I.P.O.E.E., A.M.I.E., <i>Post-Master General, B. & O.</i> Patna.
5-3-24	R	Banerjee , P. N., M.A. (CANTAB.), A.M.I.E., F.C.U., <i>Civil Engineer</i> . 12, Mission Row, Calcutta.
7-12-36	R	Banerjee , S., I.C.S. Collector's House, Hooghly.
3-8-31	N	Barua , KANAK LAL, RAI BAHADUR, B.L., F.R.S.E., <i>President, Kamrupa Anusundhan Samiti, Late Minister to the Government of Assam</i> . Rosaville, Nangthymai, Shillong, Assam.
3-12-23	R	Barwell , N. F., M.C., M.A., IT.-COL. (RETD.), <i>Barrister-at-Law</i> . 6, Middleton Street, Calcutta (and) Aylmerton House, Aylmerton, Norfolk, England.
7-12-36	R	Basu , INDUBHUSAN, M.D. (CAL.), <i>Medical Practitioner, Associate Professor of Medicine and Visiting Physician, Carmichael Medical College</i> . 19, Vivekananda Road, Calcutta.
6-2-39	R	Basu , JNANENDRA NATH, VIDYALANKAR, <i>Member, Benares Hindu University Court, Fellow, Theosophical Society, Landholder, Director, Messrs. Thacker Spink & Co.</i> 9, Park Lane, Calcutta.
3-12-24	R	Basu , JATINDRA NATH, M.A., M.L.C., <i>Solicitor</i> . 14, Baloram Ghose Street, Calcutta.
1-3-26	R	Basu , NARENDRA KUMAR, M.L.C., <i>Advocate, High Court</i> . 12, Ashu Biswas Road, Bhawanipore, Calcutta.
2-1-28	R	Basu , NARENDRA MOHAN, M.SC., <i>Professor of Physiology</i> . 63, Hindusthan Park, Ballygunge, Calcutta.
2-10-39	N	Basu Mazoomder , WOOSHACUR, B.L., M.R.A.S., F.R.S.A. (LOND.), <i>Bengal Civil Service (Judicial), Munsif</i> . Barisal, Dist. Bakarganj (Bengal).
7-7-09	N	Bazaz , RANGNATH KHEMRAJ, <i>Proprietor, Shri Venkateshwar Press</i> . 7th Khetwadi, Bombay No. 4.
7-5-34	R	Bent , WILLIAM ANTONY, <i>Assistant, Messrs. George Henderson & Co., Ltd.</i> 101/1, Clive Street, Calcutta.
4-3-25	R	Benthall , SIR EDWARD C. KT., <i>Merchant</i> . 37, Ballygunge Park, Calcutta.
7-4-09	L	* Bentley , CHARLES A., C.I.E., M.B., D.P.H., D.T.M. & H., F.A.S.B., <i>Professor of Hygiene</i> . University of Egypt, Cairo.

Date of Election.		
6-1-36	N.	Berkeley-Hill , OWEN, A.R., M.A., M.D., B.CH. (OXON), M.R.C.S. (ENGLAND), D.T.M. (LOND.), LT.-COL., I.M.S. (RETD.). Station View, Ranchi.
4-6-28	N	Bhadra , SATYENDRA NATH, RAI BAHADUR, M.A., <i>Principal, Jagannath Intermediate College. Nayabazar, Dacca.</i>
1-8-17	R	*Bhandarkar , DEVADATTA RAMKRISHNA, M.A., PH.D., F.R.A.S.B. 2/1, Lovelock Street, Ballygunge, Calcutta.
5-4-26	N	Bhatia , M. L., M.SC., <i>Lecturer in Zoology, Lucknow University. Lucknow.</i>
7-7-24	L	Bhattacharyya , BINOYTOSH, M.A., PH.D., <i>Rajaratna, General Editor. Gaekwad's Oriental Series, and Librarian, Oriental Collections, Baroda State. Baroda.</i>
6-9-37	N	Bhattacharya , N. C., <i>Vice-Chairman, Birnagar Municipality. Birnagar, Nadia.</i>
4-6-28	N	Bhattasali , NALINI KANTA, M.A., PH.D., <i>Curator, Dacca Museum. Ramna, Dacca.</i>
6-4-31	R	Bhose , JOTISH CHANDER, M.A., B.L., <i>Advocate, Calcutta High Court. 24A, Ray Bagan Street, Calcutta.</i>
5-2-34	A	Bhuyan , SURYYA KUMAR, RAI BAHADUR, M.A., B.L., A.E.S., <i>Honorary Provincial Director of Historical and Antiquarian Studies, Assam; Professor, Cotton College. Gauhati, Assam.</i>
5-3-28	R	Biswas , THE HON'BLE MR. JUSTICE CHARU CHANDRA, C.I.E., M.A., B.L., <i>Judge, High Court. 58, Puddopukur Road, P.O. Elgin Road, Calcutta.</i>
1-8-23	L	Biswas , KALIPADA, M.A., D.SC. (EDIN.), F.R.S.E., <i>Superintendent, Royal Botanic Garden. Botanic Garden P.O., Calcutta.</i>
3-1-27	N	Bivar , HUGH GODFREY STUART, I.C.S., <i>District and Sessions Judge. Faridpur.</i>
4-11-35	N	Bor , N. L., M.A., D.SC., I.F.S., <i>Forest Botanist, Forest Research Institute. New Forest, Dehra Dun.</i>
6-7-25	R	Bose , MANMATHA MOHAN, M.A., <i>Professor Emeritus, Scottish Church College. 19, Gokul Mitra Lane, Hatkhola, Calcutta.</i>
7-12-36	N	Bose , AMBUJ NATH, M.B.E., M.D. (LAUSANNE), F.R.C.P. (EDIN. & LOND.), LT.-COL., I.M.S. <i>Medical College, Patna.</i>
7-8-39	R	Bose , GIRINDRASHEKHAR, M.B., D.SC., F.N.I., <i>Professor of Psychology and Head of Department of Psychology, Calcutta University. 14, Parsi Bagan Lane, P.O. Amherst Street, Calcutta.</i>
2-3-31	N	Bose , SUDHANSU KUMAR, B.SC. (CAL.), A.R.S.M., B.SC. (MINING) (LONDON), <i>Professor of Mining and Surveying. Indian School of Mines, Dhanbad.</i>
2-1-39	R	Bose , SUDHANSU MOHAN, M.A., LL.B. (CANTAB.), <i>Barrister-at-Law, Member, Public Service Commission, Bengal. 3, Federation Road, P.O. Amherst Street, Calcutta.</i>
2-11-36	R	Bothra , SUBHKARAN SINGH, <i>Landholder and Student. 29, Vivekananda Road, Calcutta.</i>
4-5-31	R	Bottomley , JOHN MELLOR, B.A. (OXON), I.E.S., <i>Director of Public Instruction, Bengal. 1, Sunny Park, Ballygunge, Calcutta.</i>
5-12-32	N	Boyle , CECIL ALEXANDER, MAJOR, D.S.O., <i>Adviser in Languages and Secretary to the Board of Examiners. Army Headquarters, Simla.</i>
3-12-34	R	Brahmachari , PHANINDRA NATH, M.SC., M.B. 19, <i>Loudon Street, Calcutta.</i>

Date of Election.		
1-1-08	L	*Brahmachari , SIR UPENDRA NATH, KT., RAI BAHADUR, M.A., PH.D., M.D., F.S.M.F., F.N.I., F.R.A.S.B. 19, Loudon Street, Calcutta.
7-11-27	N	Brahmachary , SARAT CHANDRA, RAI BAHADUR. M.A., B.T. Kasba Road, Ballygunge, P.O. Dhakuria, 24-Pergs.
6-1-36	R	Brocke , A. G., D.SC. (DOCTOR PHILOSOPHÆ NATURALIS) (JENA), Branch Manager, Pharmaceutical Department, 'Bayer'. 52/4/1, Ballygunge Circular Road, Calcutta.
3-7-07	L	*Brown , JOHN COGGIN, O.B.E., D.S.C., F.G.S., M.I.M.E., M.INST.M.M., M.I.E., F.R.A.S.B. c/o Messrs. Grindlay & Co., 54, Parliament Street, Westminster, London, S.W.1.
6-10-09	R	*Brown , PERCY, A.R.C.A., F.R.A.S.B., Curator, Victoria Memorial, Calcutta.
8-1-96	F	*Burn , SIR RICHARD, KT., C.S.I., F.R.A.S.B. 9, Staverton Road, Oxford, England.
3-12-34	F	Burt , SIR BRYCE CHUDLEIGH, KT., C.I.E., M.B.F., B.S.C., I.A.S., F.N.I. c/o The Westminster Bank, Bishopston, Bristol, England.
2-4-13	A	Calder , CHARLES CUMMING, B.S.C., F.N.I., F.L.S., Superintendent, Royal Botanic Garden, Sibpur, Howrah.
4-12-39	R	Cameron , REV. ALLAN, M.A., PH.D., Principal, Scottish Church College. 3 and 4, Cornwallis Street, Calcutta.
4-11-29	F	Campbell , SIR GEORGE R., KT., Westcroft, Pyrford, Surrey, England.
4-7-38	R	Carstairs , ANDREW McLAREN, M.A., Bengal Chamber of Commerce. Royal Exchange Buildings, 2, Clive Street, Calcutta.
3-2-36	F	Catto , OF CAIRNCATTO. THE RIGHT HON'BLE LORD, BART. 'Woodlands', Clamp Hill, Stanmore, Middlesex, England.
1-9-20	R	Chakladar , HARAN CHANDRA, M.A. 28/4, Srimohan Lane, Kalighat, Calcutta.
7-3-32	R	Chakraborty , KHIRODE BEHARI, Engineer and Manufacturer. 7, Hindusthan Park, P.O. Ballygunge, Calcutta.
4-7-27	R	Chakravarti , CHINTAHARAN, M.A., KĀVYATĪRTHA, Lecturer, Bethune College. 28/3, Sahanagar Road, Kalighat, Calcutta.
3-2-30	N	Chakravarti , M. N., M.S.C., A.T.S. 'Gitanjali'. 37, Mayo Road, Lahore.
3-1-27	N	Chakravarti , NIRANJANPRASAD, M.A., PH.D. (CANTAB.), Government Epigraphist. Office of the Government Epigraphist, Ootacamund, Nilgiris, S. India.
7-2-38	R	Chakravarti , P. K., M.A., B.L., Advocate, High Court. 105, Harish Mukherjee Road, Calcutta.
6-2-39	N	Chakravarti , PROF. RASH MOHAN, PH.B., PURANRATNA, VIDYAVINODE, Superintendent, Rammala Chhatravas, Comilla, Bengal.
5-6-33	N	Chakravarti , SUSIL KUMAR, M.A., Zemindar, Cooch Behar (Cooch Behar State).
6-1-30	A	Chakraverti , SHRISH CHANDRA, B.L., Attorney-at-Law, High Court, Calcutta. 2, Marquis Street, Calcutta.
1-9-20	R	*Chanda , RAMAPRASAD, RAI BAHADUR, B.A., F.R.A.S.B. 37/1, Manoharpukur Road, Kalighat, Calcutta.
3-1-06	L	Chapman , JOHN ALEXANDER. 32, Lavington Road, West Ealing, London, W.3.

Date of Election.		
7-5-28	R	Chatterjee , SIR NALINI RANJAN, KT., M.A., B.L., <i>Retired Judge and sometime acting Chief Justice, Calcutta.</i> 91A, Harish Mukherjee Road, Bhawanipore, Calcutta.
7-2-27	N	Chatterjee , ASHOKE, B.A. (CAL.), B.A. (CANTAB.), <i>Labour Welfare Office.</i> Burnpur, Via Asansol.
27-10-15	F	Chatterjee , SIR ATUL CHANDRA, K.C.I.E., K.C.S.I., <i>Late High Commissioner for India.</i> Withdean, Cavendish Road, Weybridge, Surrey, England.
2-3-36	R	Chatterjee , MANOMOHAN, B.SC. (CAL.), PH.D. (LOND.), A.R.C.S., D.I.C., <i>Professor of Geology, Presidency College.</i> 170/2, Lower Circular Road, Calcutta.
1-10-20	R	Chatterjee , NIRMAL CHANDRA, <i>Barrister-at-Law.</i> 47/1, Theatre Road, Calcutta.
4-7-27	R	Chatterjee , PATTPABON, M.A., B.L., <i>Vakil, High Court.</i> 84, Harrison Road, Calcutta.
3-12-34	N	Chatterjee , SISIR CHANDRA, M.D. (EDIN.), M.R.C.P. (EDIN.), D.P.H. (EDIN.), <i>Chief Medical & Health Officer.</i> Headquarters Offices. N.W. Ry., Lahore.
4-6-34	N	Chatterji , BIJAN RAJ, PH.D. (LONDON), D.LITT. (PUNJAB), <i>Professor of History, Meerut College.</i> Meerut.
5-1-31	R	Chatterji , DURGACHARAN, M.A., <i>Lecturer in Sanskrit, Bethune College.</i> 39, Jatin Das Road, Kalighat, Calcutta.
7-6-11	R	Chatterji , KARUNA KUMAR, LT.-COL., I.T.F., M.C., V.H.A.S. 6/1, Wood Street, Calcutta.
7-5-28	R	Chatterji , KEDAR NATH, B.SC. (LONDON), A.E.C.S. (LONDON). 43, Wellesley Street, Calcutta.
6-8-24	R	*Chatterji , SUNITI KUMAR, M.A. (CAL.), D.LITT. (LONDON), F.R.A.S.B. <i>Khaira Professor of Linguistics, Calcutta University.</i> 'Sudharina', 16, Hindusthan Park, (off Rashbihari Avenue East End), Ballygunge, Calcutta.
2-3-36	R	Chatterji , MRS. TUHINIKA, M.A., KAVYATIRTHA, <i>Research Scholar, Examiner, Calcutta University.</i> 5, Wood Street, Calcutta.
5-11-24	R	Chattopadhyay , K. P., M.SC., <i>Professor, Calcutta University.</i> 2, Palm Place, Ballygunge, Calcutta.
2-11-25	N	Chattopadhyaya , KSHETRESA CHANDRA, M.A., <i>Lecturer in Sanskrit.</i> Allahabad University, Allahabad.
4-4-38	R	Chaudhuri , MRS. ROMA, M.A., D.PHIL. (OXON). 3, Federation Road, Calcutta.
4-11-35	R	Chaudhuri , S. N. 52, Ballygunge Circular Road, Calcutta.
5-12-23	R	Chopra , B. N., D.SC., F.N.I., F.L.S., <i>Assistant Superintendent, Zoological Survey of India.</i> Indian Museum, Calcutta.
1-2-22	R	*Chopra , R. N., C.I.E., M.A., SC.D., M.D. (CANTAB.), F.R.C.P., F.N.I., F.R.A.S.B., BREVET-COL., I.M.S., <i>Professor of Pharmacology.</i> School of Tropical Medicine and Hygiene, Chittaranjan Avenue, Calcutta.
5-12-27	L	Chowdhury , SIR CHHAJURAM, KT., C.I.E., M.L.C. 21, Belvedere Road, Calcutta.
2-4-28	R	Chowdhury , RAI JATINDRANATH, <i>Zemindar.</i> 36, Russa Road, Tollygunge, Calcutta.
3-7-07	L	*Christie , WILLIAM ALEXANDER, KYNOCHE, B.SC., PH.D., M.INST.M.M., F.R.A.S.B. Secretariat, Principal Supply Officers' Committee (India), Defence Department, Simla.
2-2-31	R	Clough , JOHN, <i>Barrister-at-Law.</i> 17, Store Road, Ballygunge, Calcutta.

Date of Election.		
5-5-30	F	Cooper , G. A. P. 29, Eccleston Street, Eaton Square, London, S.W. 1.
6-11-33	R	Coulson , ARTHUR LENNON, D.SC. (MELB.), D.I.C., F.N.I., F.G.S. Geological Survey of India, 27, Chowringhee, Calcutta.
4-11-29	L	* Cotter , GERALD DE PURCELL, B.A., SC.D. (DUBLIN), M.INST.M.M., F.G.S., F.R.A.S.B. 'Fallowfield', Manor Road, Penn., Bucks., England.
2-11-25	R	Crookshank , HENRY, B.A., B.A.I. (DUBLIN), F.N.I., Assistant Superintendent, Geological Survey of India. 27, Chowringhee, Calcutta.
6-3-39	N	Culshaw , REV. WESLEY JAMES, Methodist Minister. P.O. Serenga, Dist. Bankura.
7-3-32	R	Darbari , M. D., Incorporated Accountant, S. B. Billimoria & Co., Ltd. 100, Clive Street, Calcutta.
4-3-25	R	Das , AJIT NATH, RAI BAHADUR, M.R.A.S., F.Z.S., Zemindar. 24, South Road, Entally, Calcutta.
5-12-39	N	Das-Gupta , C. C., M.A., Archaeological Survey of India. Western Circle, Poona.
1-3-26	R	Datta , HIRENDRA NATH, M.A., B.L., Solicitor, High Court. 139, Cornwallis Street, Calcutta.
6-8-24	L	Davies , L. M., LT.-COL., M.A., F.R.S.E., F.R.A.I., F.G.S. 8, Garscube Terrace, Murrayfield, Edinburgh, 12, Scotland.
4-3-29	R	De , J. C., M.B., LT.-COL., I.M.S. 11, Rowland Road, Calcutta.
19-9-95	L	De , KIRAN CHANDRA, C.I.E., B.A., I.C.S. (RETD.), Manager, Nawab Bahadur of Murshidabad Estate. Lalbagh, Murshidabad.
4-3-25	R	Deb , KSHITINDRA, RAI MAHASAI. 21/E, Rani Sankari Lane, Kalighat, Calcutta.
5-12-27	L	Dechhen , H.H. MAHARANI KUNZANG, Maharani of Sikkim. Gangtök, Sikkim.
5-5-30	N	Deo , SIR PRATAP CHANDRA BHANJ, K.C.I.E., Maharajah, Ruler of Mayurbhanj State. P.O. Baripada, Mayurbhanj, B.N.R.
5-11-34	R	Dey , MUKUL, A.R.C.A. (LOND.), M.C.S.E. (U.S.A.), F.R.S.A., etc., Principal, Govt. School of Art; Officer in charge, Art Section Keeper of Govt. Art Gallery; Trustee, Indian Museum. 28, Chowringhee, Calcutta.
4-5-10	L	Dhavlé , THE HON'BLE MR. JUSTICE SHANKAR BALAJI, B.A., I.C.S., Judge, Patna High Court. Patna.
4-8-20	N	* Dikshit , KASHINATH NARAYAN, M.A., F.R.A.S.B. c/o The Office of the Director-General of Archaeology, New Delhi.
5-1-98	R	Dods , WILLIAM KANE, Agent Hongkong and Shanghai Banking Corporation. 6, Minto Park, Alipur, Calcutta.
2-2-31	A	Douglas , GORDON WATSON, B.SC., D.L.M., State Chemist to the Government of Bhopal. State Laboratory, Bhopal, Central India.
2-7-02	L	Doxey , FREDERICK. 'Ballygunge', Cooden Drive, Bexhill-on-Sea, Sussex, England.
7-11-32	R	Driver , DARAB CURSETJI, M.A. (CANTAB.), Barrister-at-Law, Constituted Attorney to Messrs. Tata & Sons, Ltd., Managing Agents for The Tata Iron & Steel Co., Ltd. 87/C, Park Street, Calcutta.
6-6-38	N	Dudhoria , NABA KUMAR SING, Zemindar and Banker. Azimganj. Dt. Murshidabad.

Date of Election.		
1-7-29	R	Dunn, JOHN ALEXANDER, D.Sc., D.I.C., F.N.I., F.G.S., Assistant Superintendent, Geological Survey of India. 27, Chowringhee, Calcutta.
6-9-37	A	Durniz-Podewils, COUNT, Consul-General for Germany. 34, Park Street, Calcutta.
2-1-33	R	Dutch, ROBERT AUSTEN, B.A. (CANTAB.), I.C.S., District Judge. Alipore, Calcutta.
3-7-33	R	Dutt, GURU SADAY, Barrister-at-Law, I.C.S. 12, Loudon Street, Calcutta.
30-9-35	R	Dutt, MOHENDRA NATH, L.E., Consulting Engineer. 12, Kailas Bose Lane, Howrah.
5-12-32	R	Dutt, NALINAKSHA, M.A., PH.D., D.LITT. (LOND.), Lecturer, Calcutta University. 91-1B, Manicktollah Street, Calcutta.
5-3-28	A	Eberl, OTTO, DR. JUR., Late Vice-Consul for Germany. 2, Store Road, Ballygunge, Calcutta.
1-11-38	N	Eekhout, JHR. P.J., Vice-Consul for Netherlands. Clarke's Hotel, Simla.
5-1-31	L	Evans, PERCY, B.A. (CANTAB.), F.G.S., Geologist. c/o The Burma Oil Co., Digboi, Assam.
6-2-28	L	Ezra, SIR DAVID, KT., F.Z.S., M.B.O.U. 3, Kyd Street, Calcutta.
2-5-38	R	Faroqui, NAWAB SIR K. G. M., KT., of Ratanpur. 20/1, Store Road, Calcutta.
2-12-29	N	Fawcus, LOUIS REGINALD, C.I.E., B.A. (CANTAB.), Indian Civil Service, Magistrate and Collector. Dacca.
3-8-04	L	*Fermor, SIR LEWIS LEIGH, KT., O.B.E., M.INST.M.M., D.Sc., A.R.S.M., F.G.S., F.R.S., F.N.I., F.R.A.S.B., Late Director, Geological Survey of India. c/o Messrs. Lloyds Bank, Ltd., 6, Pall Mall, London.
31-10-06	F	Finlow, ROBERT STEEL, C.I.E., B.Sc., F.I.C., Late Director of Agriculture, Bengal. c/o Messrs. Grindlay & Co., Ltd., 54, Parliament Street, London, S.W. 1.
3-2-36	R	Flury, E. C., Manager, Messrs. Volkart Bros. Post Box No. 606, Calcutta.
5-11-13	R	*Fox, CYRIL S., D.Sc. (BIRM.), M.I.M.E., F.G.S., F.N.I., F.R.A.S.B. Geological Survey of India, 27, Chowringhee, Calcutta.
5-11-28	R	Galstaun, JOHN CARAPIET, O.B.E., Merchant and Landholder. 234/4, Lower Circular Road, Calcutta.
1-11-26	R	Galstaun, SHANAZAN, G., M.A., D.M.R.E., M.R.C.S., L.R.C.P., Medical Practitioner, Radiologist, Medical College Hospital. 34, Chowringhee Road, Calcutta.
6-10-09	R	*Gangoly, ORDHENDRA COOMAR, B.A., F.R.A.S.B. 2, Asutosh Mukherjee Road, Calcutta.
7-9-36	R	Gangooly, PHANINDRA LAL, M.A., Lecturer in Mathematics, Calcutta University. P. 507, Rash Behari Avenue, Calcutta.
5-11-34	R	Gee, EDWARD ROWLAND, M.A. (CANTAB.), F.N.I., F.G.S., Assistant Superintendent, Geological Survey of India. 27, Chowringhee, Calcutta.
2-1-33	N	George, JAMES, B.A. (CANTAB.), I.C.S., Joint Magistrate and Dy. Collector. Dacca.
6-2-33	L	Ghatak, JYOTISH CHANDRA, M.A. (TRIPLE), SAHITYA SARASWATI, JYOTISH-SAGARA, Professor. 4, Boloram Bose Ghat Road, Bhawanipore, Calcutta.

Date of Election.		
7-5-28	R	Ghosal , UPENDRA NATH, M.A., PH.D., <i>Professor of History, Presidency College.</i> 21, Badur Bagan Row, Calcutta.
5-4-26	R	Ghose , BIMAL CHANDRA, <i>Barrister-at-Law.</i> 27/1, Harish Mukherjee Road, Calcutta.
1-4-29	R	Ghose , DEB PROSONNO, <i>Zemindar.</i> 75, Beadon Street, Calcutta.
7-1-29	R	Ghose , THE HON'BLE MR. JUSTICE MOHIM CHANDRA, B.A. (CAL.), M.A. (CANTAB.), I.C.S., <i>Barrister-at-Law (Inner Temple), Judge, High Court.</i> 4A, Little Russell Street, Calcutta.
3-12-24	R	Ghose , SUSHIL CHANDRA, B.A., <i>Deputy Magistrate.</i> 1, Sikdarbagan Street, Calcutta.
7-9-36	R	Ghosh , J., M.A. (CAL.), PH.D. (EDIN.), F.N.I., <i>Professor of Mathematics, Presidency College.</i> 1A, Rupchand Mukherji Lane, Calcutta.
4-9-39	N	Ghosh , J. C., D.S.C., F.N.I., <i>Director, The Indian Institute of Science.</i> Bangalore.
2-4-24	R	Ghosh , K., D.T.M., D.P.H. (CANTAB.), L.M.S., <i>Medical Practitioner.</i> 45, Creek Row, Calcutta.
7-3-27	R	Ghosh , PHANINDRA NATH, M.A., PH.D., SC.D. (PADUA), F.INST.P., <i>Sir Rashbehary Ghosh Professor of Applied Physics, University of Calcutta.</i> 92, Upper Circular Road, Calcutta.
4-9-12	R	Ghosh , TARAPADA, <i>Zemindar.</i> 14, Paddapukur Street, Kidderpore, Calcutta.
1-2-26	R	Ghuznavi , SIR ABDUL HALIM, KT., M.L.A., <i>Zemindar.</i> 18, Canal Street, Entally, Calcutta.
6-8-28	R	Ghuznavi , ISKANDER S. K., <i>Zemindar.</i> 45, Jhowtolla Road, Calcutta (and) Dikdnar, Mymensingh.
7-12-36	R	Gillespie , ANDREW DOLLAR, <i>Chemist and Senior Partner, Messrs. Bathgate & Co.</i> 17, Old Court House Street, Calcutta.
5-3-28	R	Gooptu , DWIJENDRA NATH, <i>Medical Practitioner and Landholder.</i> 5, Middleton Street, Calcutta.
7-9-10	N	*Gravelly , FREDERIC HENRY, D.S.C., F.N.I., F.R.A.S.B. Museum House, Egmore, Madras.
5-12-00	L	Grieve , JAMES WYNDHAM ALLEYNE. c/o Messrs. Coutts & Co., 440, Strand, London, W.C. 2.
4-3-35	R	Groth , EDWARD, M., <i>American Consul.</i> American Consulate General, 9, Esplanado Mansions, Esplanado, Calcutta.
4-2-25	R	*Guha , B. S., M.A., PH.D. (HARVARD), F.N.I., F.R.A.S.B. Indian Museum, Calcutta.
5-3-19	N	Gupta , SIVAPRASAD. Seva Upavana, Benares City.
5-8-15	R	Gurner , CYRIL WALTER, B.A. (OXON), I.C.S., <i>Chairman, Improvement Trust.</i> 4, Theatre Road, Calcutta.
5-2-34	R	Haldar , BHARATI VIKAS, M.A., B.L., <i>Advocate, High Court.</i> 47, Haldarpara Road, Kalighat, Calcutta.
6-1-30	A	Haldar , SUDHINDRA KUMAR, M.A., I.C.S., <i>Commissioner of Excise and Salt, Bengal.</i> 241, Lower Circular Road, Calcutta.
6-9-37	N	Halim , ABDUL, DR., M.A., <i>Lecturer in History, Muslim University.</i> Aligarh.
2-4-24	R	Haq , M. MAHFUZ-UL, M.A., <i>Professor, Presidency College.</i> 8/B, Dargah Road, Park Circus, Calcutta.
1-5-12	A	Harley , ALEXANDER HAMILTON, M.A., J.E.S., <i>Late Principal, Islamia College.</i> 19, Wellesley Square, Calcutta.

Date of Election.		
1-2-26	F	Harris, H. G. Gunnespory Avenue, Ealing, London.
2-4-28	R*	Harris, LAWRENCE ERNEST, Engineer, Manager for India, Messrs. Sulzer Brothers. 4, Lyons Range, Calcutta.
2-10-39	N	Hasan, KHAN BAHADUR MAULVI ZAFAR, Superintendent, Archaeological Survey. Northern Circle, Agra.
5-11-19	N	Hemraj, MANYABARA RAJ GURU, C.I.E., PANDITJI. Dhokatole, Nepal.
6-8-28	N	*Heron, A. M., D.S.C. (EDIN.), F.G.S., F.R.G.S., F.N.I., F.R.S.F., Late Director, Geological Survey of India. Mines and Geology Office, Hyderabad, Deccan.
7-6-11	L	*Hidayat Hosain, MUHAMMAD, SHAMS 'UL-'ULAMA, KHAN BAHADUR, PH.D., F.R.A.S.B. 172/26, Lower Circular Road, Calcutta.
4-11-35	R	Hirtzel, MICHAEL ARTHUR FREDERICK, B.A. (TRINITY COLLEGE, OXFORD), Mercantile Assistant, Macneill & Co. 2, Fairlie Place, Calcutta.
1-4-25	R	Hobbs, HENRY, MAJOR, V.D., Merchant. 9, Old Court House Street, Calcutta.
7-3-27	A	Hopkinson, ARTHUR JOHN, I.C.S., Secretary to the Government, N.-W.F. Province. Peshawar, N.-W.F.P.
2-11-21	L	*Hora, SUNDER LAL, RAI BAHADUR, D.S.C., F.Z.S., F.R.S.E., F.N.I., F.R.A.S.B. Zoological Survey of India, Indian Museum, Calcutta.
6-6-23	L	*Howard, SIR ALBERT, KT., C.I.E., M.A., F.R.A.S.B., Late Director, Institute of Plant Industry, Indore, and Late Agricultural Adviser to States in Central India. 14, Liskeard Gardens, Blackheath, London, S.E. 3.
7-3-32	N	Hughes, ARTHUR, B.A. (MANCHESTER), Indian Civil Service, District Magistrate. Faridpore.
6-8-34	N	Husain, SYED ATA, M.A. (CAL.), C.E. (ROORKEE), Retired Superintending Engineer, Hyderabad State. Mohalla Lingumpally, Hyderabad, Deccan.
6-6-23	A	*Hutton, J. H., C.I.E., I.C.S., M.A., D.S.C., F.R.A.S.B. University Museum of Archæology and Ethnology, Downing Street, Cambridge, England.
1-2-11	L	Insch, JAMES. 18, Beechwood Avenue, Boscombe, Hants, England.
2-5-38	R	Jacob, J. R., Director, Messrs. B. N. Elias & Co., Merchant and Landholder. Norton Buildings, Old Court House Corner, Calcutta.
6-6-27	L	Jain, BALDEODAS, Merchant and Banker. 21, Armenian Street, Calcutta.
2-2-21	R	Jain, CHHOTE LAL, M.R.A.S. 174, Central Avenue, Calcutta.
6-1-30	N	Jain, NIRMAL KUMAR. Devashrama, Arrah.
6-8-28	N	Jaitly, P. L., Electrical Engineer, Merchant. 15, Canning Road, Allahabad.
1-11-26	N	Jameson, THOMAS BLANDFORD, MAJOR, M.C., M.A. (CANTAB.), I.C.S., District and Sessions Judge. Dinajpur.
1-11-38	R	Jatia, KANAI LALL. 21, Roopchand Roy Street, Calcutta.
4-2-29	R	Jenkins, WALTER ALLEN, D.S.C. (SHEFFIELD), L.E.S. United Service Club, Calcutta.
1-11-11	L	*Kamaluddin, AHMAD, SHAMS 'UL-'ULAMA, M.A., I.E.S., 3, Nawab Abdur Rahman Street, Calcutta.

Date of Election.		
4-5-10	L	*Kemp, STANLEY W. , B.A., D.S.C., F.R.S., F.A.S.B. <i>Marine Biological Association of U.K.</i> The Laboratory, Citadel Hill, Plymouth, England.
2-5-30	A	Kenny, DICK EDWARD COURTENAY , LT.-COL., I.A., <i>Deputy Commissioner, Tavoy.</i> Burma.
3-12-24	R	Khan, REZAUR RAHMAN , M.A., B.L., <i>Deputy President, Bengal Legislative Council.</i> 46, Old Ballygunge 1st Lane, Calcutta.
2-8-26	R	Khettry, BENIMADHO , <i>Proprietor, Messrs. Gouri Shanker Khettry, Landholders, Bankers and Merchants.</i> 15, Paggiyapatti, Barabazar, Calcutta.
2-11-25	F	Kimura, R. (KO-SHI), <i>Principal, College Department of Rishso University.</i> Osaki Machi, Tokyo, Japan.
5-2-34	N	Kirby, WALTER , B.S.C., <i>Inspector of Mines in India.</i> Dhanbad, E.I.R.
4-11-35	R	Klebe, ANINA , née BRANDT, PH.D. (GREIFSWALD, GERMANY), <i>Psychologist.</i> 26, Royal Court, 5/1, Russell Street, Calcutta.
1-3-26	R	Kramrisch, STELLA (MRS.), PH.D., <i>Lecturer in Ancient Indian History (Fine Arts), Calcutta University.</i> 7, Raja Santosh Road, Alipur, Calcutta.
7-3-23	A	Labey, GEORGE THOMAS , M.C., <i>Bengal Pilot Service.</i> United Service Club, Calcutta.
4-2-35	R	Lal, RAM BIHARI , M.B.B.S., D.P.H., D.T.M. & H., D.B., F.N.I., <i>Professor of Vital Statistics and Epidemiology, All-India Institute of Hygiene and Public Health.</i> 21, Chittaranjan Avenue, Calcutta.
5-2-34	R	Law, BHABANI CHURN , <i>Merchant, Zemindar and Artist.</i> 223, Cornwallis Street, Calcutta.
5-8-14	L	Law, BIMALA CHARAN , M.A., B.L., PH.D., F.R.HIST.S. 43, Kailas Bose Street, Calcutta.
1-2-11	R	*Law, NARENDRA NATH , M.A., B.L., PH.D., F.R.A.S.B. 96, Amherst Street, Calcutta.
4-2-35	R	Law, PARBUTTY CHURN. 223, Cornwallis Street, Calcutta.
1-7-14	R	Law, SATYA CHURN , M.A., B.L., PH.D., F.N.I., F.Z.S., M.B.O.U. 50, Kailas Bose Street, Calcutta.
7-6-26	R	Lemmon, RICHARD DENNIS , <i>Merchant.</i> c/o Messrs. Martin & Harris, Ltd., 17, Prinsep Street, Calcutta.
1-6-31	R	Lort-Williams, THE HON'BLE MR. JUSTICE JOHN , KT., K.C., <i>Barrister-at-Law, Judge, High Court.</i> 227/1, Lower Circular Road, Calcutta.
5-7-26	A	Lyne, HOWARD WILLIAM , I.C.S. Khulna, E.B.R.
2-8-05	L	*McCay, DAVID , LT.-COL., I.M.S., M.D., B.CH., B.A.O., M.R.C.P., F.R.A.S.B. c/o The Standard Bank of S. Africa, Hanover, Cape Province, S. Africa.
11-1-93	L	*MacLagan, SIR EDWARD DOUGLAS , K.C.S.I., K.C.I.E., F.R.A.S.B. 39, Egerton Terrace, London, S.W. 3.
7-6-16	N	Mahajan, SURYA PRASAD. Murarpur, Gaya.
3-3-20	R	Mahalanobis, P. C. , M.A., B.S.C., F.N.I., I.E.S., <i>Professor, Presidency College.</i> 210, Cornwallis Street, Calcutta.
2-5-38	R	Mahtab, MAHARAJ KUMAR A. C. Bijay Manzil, 2, Judge's Court Road, Alipur, Calcutta.
1-3-11	R	Mahtab, SIR BIJAY CHAND , K.C.S.I., I.O.M., MAHARAJA-DHIRAJA BAHADUR OF BURDWAN. 2, Judge's Court Road, Alipur, Calcutta.

Date of Election.		
3-2-30	N	Mahtab , UDAY CHAND, B.A., <i>Maharaj Kumar of Burdwan</i> . The Palace, Burdwan.
6-2-24	R	Mahindra , K. C., B.A. (CANTAB.). Messrs. Martin & Co., 12, Mission Row, Calcutta.
3-7-39	R	Majumdar , JATINDRA MOHAN, M.A., <i>Deputy Dock Superintendent, Calcutta Port Commissioners</i> . 29, School Row, Bhawanipore, Calcutta.
2-2-16	R	Majumdar , NARENDRA KUMAR, M.A., <i>Professor, Calcutta University</i> . 3, Government Place, West, Calcutta.
4-6-13	N	Majumdar , RAMESH CHANDRA, M.A., PH.D., <i>Vice-Chancellor, Dacca University</i> . Ramna, Dacca.
5-5-30	A	Mallam , G. L., CAPTAIN, I.A., <i>Census Superintendent</i> . Peshawar, N.-W.F.P.
4-11-29	R	Mallya , BANTWAL GANAPATHY, LT.-COL., I.M.S., F.R.C.S.E., <i>Superintendent, Campbell Medical School</i> . Calcutta.
7-9-36	N	Mandhata , H. C., M.A. (ALLAHABAD), <i>Member, Pelman Institute, formerly History Lecturer, Agra College</i> . Ghaziabad, Meerut.
6-2-18	L	*Manen , JOHAN VAN, C.I.E., <i>Officer de l'Instruction Publique, F.R.A.S.B.</i> 6, Temple Chambers, 6, Old Post Office Street, Calcutta.
5-6-01	F	Mann , HAROLD HART, D.SC., M.SC., F.I.C., F.L.S. Woburn Experimental Station, Aspley Guise, Bedfordshire, England.
6-1-30	N	Martin , M. F. C., MAJOR, R.E. c/o The Garrison Engineer, Loralai, Baluchistan.
5-5-30	A	Matthias , OWEN GARDINER, <i>Managing Director, Messrs. Smith Stanistreet & Co., Ltd.</i> Stanistreet House, 18, Convent Road, Entally, Calcutta.
2-1-28	N	Mello , FROILANO DE, COLONEL, <i>Director-General of Medical Services in Portuguese India, Professor of Parasitology</i> . Nova Gôa.
6-3-39	R	Meyer , MISS SALLY, M.A., <i>Professor of Botany, Bethune College</i> . 11, Sudder Street, Calcutta.
5-11-84	L	*Middlemiss , CHARLES STEWART, C.I.E., F.R.S., B.A., F.G.S., F.R.A.S.B. Aviemore, Crowborough, Sussex, England.
1-2-26	N	*Mills , JAMES PHILIP, I.C.S., M.A. (OXON), J.P., F.N.I., F.R.A.S.B. Shillong, Assam.
5-6-12	N	Misra , CHAMPA RAM, B.A., RAI BAHADUR, Pandit, <i>Diwan, Chhatarpur State</i> . Bundelkhand, C.I.
2-4-24	R	Mitra , J. C., M.A., B.L., <i>Retired Accountant-General, Bengal</i> . 1, Abinash Mitter Lane, Calcutta.
5-3-24	N	Mitter , THE HON'BLE SIR B. L., K.C.S.I., M.A., B.L., <i>Barrister-at-Law, Advocate-General, Federal Court</i> . New Delhi.
5-4-26	R	Mitter , KHAGENDRA NATH, RAI BAHADUR, M.A., <i>Professor, Presidency College (Retired)</i> . 6, Ballygunge Place, Calcutta.
30-9-35	R	Mitter , SUDHIR CHUNDER, <i>Barrister-at-Law</i> . 19, Camac Street, Calcutta.
7-12-36	R	Mittra , S. C. 34, Shampukur Street, Calcutta.
1-11-26	R	Modi , JAL R. K., B.A. 4, Camac Street, Calcutta.
5-3-34	R	Modi , JEHANGIR JEEVANJI JAMSHEDJI, <i>Merchant</i> . 5, Dhurumtollah Street, Calcutta.
5-11-24	R	Mookerjee , B. N., B.A. (CANTAB.), <i>Engineer</i> . 12, Mission Row, Calcutta.
2-7-24	R	Mookerjee , SYAMAPRASAD, M.A., B.L., D.LITT., <i>Barrister-at-Law</i> . 77, Asutosh Mookerjee Road, Calcutta.

Date of Election.		
5-4-37	N	Mooney , H. F., I.F.S., <i>Forest Adviser</i> . Sambalpur, B.N. Ry., Orissa.
5-7-37	N	Mozumdar , SUPRABHAT, <i>Master</i> , <i>Rajkumar College</i> . Staff Club, Raipur, C.P.
2-2-21	N	Mukerjee , SUBODH CHANDRA, SHASTRI, M.A., DOCTEUR-ES-LETTRES (PARIS), <i>Secretary</i> , <i>Mayurbhanj State</i> . Baripada.
6-2-28	R	Mukerji , SIR MANMATHA NATH, KT., M.A., B.L., <i>Late Judge</i> , <i>High Court</i> . 8/1, Harsi Street, Calcutta.
5-7-37	R	Mukerji , PANNALAL, RAI BAHADUR, <i>Zemindar and Honorary Magistrate</i> . 7, Rajmohani Road, Uttarpara, Hooghly.
6-3-39	R	Mukerjee , S. C., <i>Retired Member of the Indian Civil Service</i> , 25/1, Rowland Road, Calcutta.
5-12-27	R	Mukherjee , SUSIL KUMAR, F.R.C.S. (EDIN.), D.O. (OXON), D.O.M.S. (LOND.), <i>Ophthalmic Surgeon</i> , <i>Carmichael Medical College Hospitals</i> . 1/1, Wood Street, Calcutta.
7-11-27	N	Mukherjee , DEVAPROSANNA, M.A., B.L., <i>Zemindar</i> . Burdwan.
2-8-26	R	*Mukherjee , JNANENDRA NATH, D.SC. (LONDON), F.C.S. (LONDON), F.N.I., F.R.A.S.B., <i>Ghose Professor of Chemistry</i> , <i>University of Calcutta</i> . 92, Upper Circular Road, Calcutta.
5-7-26	R	Mukhopadhyaya , PRABHAT KUMAR, M.A., <i>Research Assistant</i> , <i>Calcutta University</i> . 6, Hindustan Park, Ballygunge, Calcutta.
2-2-21	R	Mukhopadhyaya , RAMAPRASAD, M.A., B.L. 77, Ashutosh Mookerjee Road, Bhawanipore, Calcutta.
2-4-28	R	Mullick , KARTICK CHURN, KUMAR, <i>Director</i> , <i>Raja D. N. Mullick & Sons, Ltd.</i> Colootola Rajbati, Chittaranjan Avenue, Calcutta.
6-8-34	R	Mullick , MANICK LALL, <i>Landholder ; Honorary Magistrate</i> , <i>Sealdah</i> . 123, Grey Street, Calcutta.
4-3-29	R	Mullick , PRAMATHA NATH, RAI BAHADUR, <i>Zemindar and Landholder</i> . 129, Cornwallis Street, Calcutta.
7-5-28	N	Murray , EUGENE FLORIAN OLIPHANT, A.I.M.M., F.G.S., <i>Mining Geologist and Engineer</i> . Tatanagar, B.N.Ry.
5-6-39	R	Nag , KALIDAS, M.A. (CAL.), D.LITT. (PARIS), <i>Lecturer</i> , <i>Calcutta University</i> . 283, Park Circus, Calcutta.
5-12-27	L	Namgyal , H.H. MAHARAJA SIR TASHI, K.C.I.E., <i>Maharaja of Sikkim</i> . Gangtok, Sikkim.
6-6-27	N	Nandi , MAHARAJA SRIS CHANDRA, M.A., M.L.C., <i>Zemindar</i> . Kasimbazar Rajbari, Kasimbazar, Murshidabad.
4-2-29	N	Narain , HIRDE, M.A., B.T., <i>Professor of History</i> , <i>Morris College</i> . Nagpur, C.P.
5-2-34	N	Nariman , RUSTOM, K., M.I.C.E., A.C.H., F.R.G.S. (<i>Retired Superintending Engineer, Punjab Irrigation</i>), <i>Professor of Engineering</i> , <i>Osmania University</i> . c/o The Union Bank of India. Fort, Bombay.
5-3-28	R	Neogi , PANCHANAN, M.A., PH.D., F.N.I., I.E.S., <i>Professor of Chemistry</i> , <i>Presidency College</i> . 21, Kundu Lane, Belgachia, Calcutta.
3-11-30	N	Newman , CARL DAMIEN, M.B.B.S., D.T.M. & H., <i>District Medical Officer</i> , <i>E.B. Ry.</i> Lalmonirhat, E.B. Ry.
3-12-24	A	Newman , CHAS. F., F.R.G.S., M.B.S.T., M.C.P. Ramnagar, Benares.

Date of Election.		
7-4-15	L.	Ohtani , COUNT KOZUI. San-ya-so, Edomachi, Fushimi, Kyoto, Japan.
5-11-28	R	Olpadvala , E. S. 52, Chowringhee, Calcutta.
1-5-39	R	Parker , E., CAPT., I.A. (RETD.). c/o Remington Rand Inc., 3, Council House Street, Calcutta.
5-2-34	R	Pasricha , CHIRANJI LAL, M.A., M.B., B.CHIR. (CANTAB.), M.R.C.S. (ENG.), L.R.C.P. (LOND.), MAJOR, I.M.S., <i>Professor of Pathology, Bacteriology and Helminthology, School of Tropical Medicine and Hygiene</i> . Chittaranjan Avenue, Calcutta.
6-6-88	L	Pagnell , AUBRAY PERCIVAL, B.A., <i>Barrister-at-Law</i> . Lamb's Building, Temple, London, E.C. 4.
5-2-34	N	Percival , FREDERICK GEORGE, PH.D. (LOND.), F.G.S., <i>General Superintendent, Ore Mines and Quarries, Tata Iron and Steel Co.</i> Jamshedpur.
1-4-25	R	Perier , FERDINAND, S.J., <i>Most Reverend the Archbishop of Calcutta</i> . 32, Park Street, Calcutta.
3-4-18	L	*Prashad , BAINI, D.SC., F.Z.S., F.R.S.E., F.N.I., F.R.A.S.B., <i>Director, Zoological Survey of India</i> . Indian Museum, Calcutta.
3-8-25	N	Pruthi , HEM SINGH, M.SC. (PUNJAB), PH.D. (LONDON), F.N.I., <i>Imperial Entomologist, Imperial Institute of Agricultural Research</i> , Pusa, Darbhanga.
3-12-24	R	Pushong , E. S., M.D., I.S.A., <i>Medical Practitioner</i> . 1, Chapel Road, Hastings, Calcutta.
3-11-30	R	Rahman , SHAH KALIMUR, M.A., <i>Lecturer in Arabic and Persian, Calcutta University</i> . Suite 16, 15/1, Hatibagan Road, Calcutta.
7-9-36	N	Ram , DOULAT, <i>Accountant, Military Secretary's Office</i> . c/o Messrs. Biru Mal Chiranji Lal, Chhatla Magni Ram, Patiala.
2-1-39	R	Ramachandran , T. N., M.A., <i>Offg. Superintendent, Archaeological Section, Indian Museum</i> . 27, Chowringhee, Calcutta.
2-10-39	N	Rangarajam , KRISHNASWAMI, <i>Employee, I.C.I. (India) Ltd., Madras</i> . Rukmani Building, Mambalam West, Madras.
6-4-36	R	Rankin , E. H. 6, Durgapore Park (or 6, Church Lane), Calcutta.
6-8-34	R	Rao , U. SHANKER, <i>Bengal Pilot Service</i> . 83, Chowringhee, Calcutta.
1-2-26	N	Rao , Y. RAMACHANDRA, RAO SAHIB, M.A., F.E.S., <i>Locust Research Entomologist</i> . 5, Scindia House, New Delhi.
2-7-24	N	Ray , ABINASH CHANDRA, B.A. R.M.H.E. School, P.O. Baidyabati.
7-9-21	R	Ray , HEM CHANDRA, M.A., PH.D. (LONDON), D.LIT. (LONDON). 135B, Vivekananda Road, Calcutta.
5-1-21	N	Ray , JAGADISNATH, MAHARAJA, <i>Maharaja of Dinajpore</i> . Dinajpore.
5-3-90	R	*Ray , SIR PROFULLA CHANDRA, KT., C.I.E., D.SC., F.N.I., F.R.A.S.B. University College of Science, 92, Upper Circular Road, Calcutta.
4-12-39	R	Ray-Chowdhury , H. C., <i>Carmichael Professor of Ancient Indian History and Culture, Calcutta University</i> . 6, Mysore Road, Kalighat, Calcutta.

Date of Election.		
5-11-28	L	Reinhart , WERNER, <i>Merchant.</i> c/o Messrs. Volkart Bros., Rychenberg, Winterthur, Switzerland.
2-4-24	F	Richards , F. J., I.C.S. 1-A, Collingham Road, London, S.W. 5.
5-2-34	R	Richter , HERBERT, DR. JUR., <i>Vice-Consul for Germany.</i> 26, Lee Road, Calcutta.
3-12-24	L	Roerich , GEORGE NICHOLAS, M.A., M.R.A.S., <i>Orientalist.</i> 310, Riverside Drive, New York, U.S.A. ('Urusvati' Naggar, Kulu, Punjab).
2-7-28	L	Roerich , NICHOLAS, <i>Professor. Honorary President, Master Institute of United Arts, New York, U.S.A., Artist-Painter.</i> 310, Riverside Drive, New York, U.S.A.
4-12-01	F	*Ross , SIR EDWARD DENISON, KT., C.F.E., PH.D., F.R.A.S.B. 229, St. James Court, Buckingham Gate, London, S.W. 1.
5-6-33	R	Rossetti , FELIX FRANCIS LEO, <i>Secretary, Y.M.C.A.</i> 42, Corporation Street, Calcutta.
6-12-26	R	Roy , SIR A. K., KT., <i>Barrister-at-Law, Advocate-General, Bengal.</i> 3, Upper Wood Street, P.O. Theatre Road, Calcutta.
5-4-37	N	Roy , DAVID, <i>Assam Civil Service.</i> Shillong, Assam.
1-12-30	N	Roy , KUMAR KAMALARANJAN, B.A., <i>Zemindar.</i> Kashim-bazar Post. Dt. Murshidabad.
6-8-24	N	Roy-Chowdhury , BRAJENDRA KISHORE, <i>Zemindar.</i> (53, Sukea Street, Calcutta.) Gauripur, Mymensingh.
7-5-28	R	*Saha , MEGHNAD, D.SC., F.R.S., F.N.I., F.R.A.S.B., <i>Palit Professor of Physics, Calcutta University.</i> 92, Upper Circular Road, Calcutta.
5-4-37	R	Sahni , M. R., M.A. (CANTAB.), D.SC. (LOND.), D.I.C., <i>Geologist, Geological Survey of India.</i> 27, Chowringhee, Calcutta.
5-2-34	L	Sale , HAROLD MONTAGUE, M.A., F.G.S., <i>Mancetter College, Athershone, Warwickshire, England.</i>
3-12-24	R	Sarkar , C. K., C.E., <i>Engineer and Architect.</i> 10, Hastings Street, Calcutta.
4-2-35	R	Sarkar , THE HON'BLE MR. NALINI RANJAN. <i>Hindusthan Buildings, Corporation Street, Calcutta.</i>
5-4-37	R	Sattar , THE HON'BLE MR. A. R. H. A., <i>Member, Council of State.</i> 32, Ezra Street, Calcutta.
6-3-33	R	Seal , SATIS CHANDRA, M.A., B.L., <i>Honorary Secretary, Indian Research Institute.</i> 55, Upper Chitpore Road, Calcutta.
1-4-25	R	Sen , BENOY CHANDRA, M.A. 'Rupeswar', <i>Diamond Harbour Road, Behala.</i>
9-12-36	R	Sen , D. N. 7, Rawdon Street, Calcutta.
3-12-24	N	Sen , H. K., M.A., D.SC. (LONDON), D.I.C., <i>Director, Indian Lac Research Institute.</i> Namkum, Ranchi.
1-6-36	N	Sen , J. M., M.ED. (LEEDS), B.SC. (CAL.), T.D. (LOND.), DIP.ED. (OXFORD), F.R.G.S., F.N.I. <i>Principal, Krishnagar College.</i> Krishnagar. Nadia.
5-12-23	L	Sen , LAKSHMAN, H.H. RAJA OF SUKET. <i>Suket State, Punjab.</i>
5-4-37	N	Sen , KSHITISH MOHAN. <i>Visvabharati, Santiniketan, Dist. Birbhum.</i>
1-4-29	R	Sen-Gupta , NARES CHANDRA, M.A., D.L., <i>Advocate, High Court.</i> 88A, Lansdowne Road, Bhowanipore, Calcutta.

Date of Election		
5-7-11	J	*Sewell , ROBERT BERESFORD SEYMOUR, C.I.E., M.A., SC.D. (CANTAB.), M.R.C.S., L.R.C.P., F.Z.S., F.L.S., F.R.S., F.N.I., F.R.A.S.B., LT.-COL., I.M.S., <i>Late Director, Zoological Survey of India</i> . 18, Barrow Road, Cambridge, England.
5-4-37	N	Sharaf-ud-Din , S., M.A., B.L., <i>Professor, Chittagong College</i> . Chittagong.
2-11-25	N	Sharif , MOHAMMAD, D.SC., F.R.M.S., F.L.S., <i>Lecturer in Zoology</i> . Muslim University, Aligarh.
6-5-29	N	Sharma , SRI RAM, M.A., M.R.A.S., M.A.O.S., <i>Professor of History</i> . D.A.V. College, Lahore.
5-8-35	N	Shattock , JOHN SWITHIN HARVEY, B.A. (OXON), I.C.S. Political Department, New Delhi.
2-5-23	F	Shebbeare , E.O., <i>Chief Game Warden</i> . Post Box No. 376, Kuala Lumpur, F.M.S.
6-1-09	N	Shirreff , ALEXANDER GRIERSON, B.A., I.C.S., <i>Commissioner</i> . Gorakhpur. U.P.
6-3-01	N	*Shirwani , THE HON'BLE NAWAB SADR YAR JUNG, MAULANA HABIB-UR-RAHMAN, F.R.A.S.B., <i>Rais, Bhikanpur</i> . Habibganj, District Aligarh.
4-1-26	N	Shortt , H. E., F.N.I., LT.-COL., I.M.S., <i>Director, King's Institute</i> , Guindy. Madras.
6-2-28	L	Shumser , JUNG BAHADUR RANA, SIR KAISER, K.B.E., SURPRADIPTA MANYAVARA, LIEUT.-GENERAL, <i>Nepalese Army</i> . Kaiser Mahal, Kathmandu, Nepal.
4-11-29	R	Siddiqi , MOHAMMAD ZUBAYR, M.A., PH.D., <i>Sir Asutosh Professor of Islamic Culture, Calcutta University</i> . P. 274, Bright Street, Park Circus, Calcutta.
6-2-39	N	Simeons , ALBERT THEODORE WILLIAM, M.D. (HEIDELBERG), Physician, Khatau Mansion, Cooperage, Bombay.
5-3-13	L	*Simonsen , JOHN LIONEL. D.SC., F.I.C., F.R.S., F.R.A.S.B. University College of North Wales, Bangor, North Wales.
6-3-39	F	Sinclair , GREGG M., <i>Director, Oriental Institute, University of Hawaii</i> . Honolulu, Hawaii, U.S.A.
6-2-18	N	Singh , MANYABARA BADA KAJI MARICHI MAN, PANDITJI, C.I.E. 38, Khichapokhari, Kathmandu, Nepal.
4-11-29	A	Singh , JAIPAL, M.A. (<i>Modern Greats</i>), <i>St. John's College, Oxford University</i> . Achimota College, Accra, West Africa.
5-3-34	L	Singh , HIS HIGHNESS THE HON'BLE MAHARAJADHIRAJA SIR KAMESWAR, K.C.I.E. Darbhanga.
2-1-33	N	Singh , RUDRA PERTAB, RAO BAHADUR, <i>Proprietor, Sonbarsa Raj</i> . Sonbarsa P.O., District Bhagalpore.
4-2-35	A	Singh , SARABJIT, M.A., B.L. P.O. Imphal, Manipur State.
3-6-35	R	Singhanja , RAGHUNATH PRASAD, VIDYABHUSAN-VISARAD, <i>Secretary, Rajasthan Research Society</i> . 73A, Chasa Dhoba Para Street, Simla, Calcutta.
5-9-12	R	Singhi , BAHADUR SINGH. (Azimganj, Murshidabad). 48, Gariahat Road, Calcutta.
7-8-33	N	Sinh , RAGHUBIR, RAJKUMAR, M.A., LL.B., <i>Heir-Apparent of Sitamau State</i> . Raghbir Niwas, Sitamau, C.I.
1-8-38	R	Sinha , B. 4, Hastings Park Street, Calcutta.
6-6-27	N	Sinha , SHEONANDAN PRASAD, M.D., <i>Assistant Surgeon</i> . Government Hospital, Jamshedpur.
6-2-28	R	Sinha , SUHRID CHANDRA, KUMAR, M.SC. 15/1, Ram Kanta Bose Street, Shambazar, Calcutta.
4-1-26	N	Sinton , J. A., O.B.E., LT.-COL., I.M.S., V.C., <i>Officer-in-Charge, Malaria Bureau</i> . Central Research Institute, Kasauli.

Date of Election.		
5-7-16	L	Sircar , GANAPATI, VIDYARATNA. 69, Beliaghata Main Road, Calcutta.
5-3-24	R	Sircar , SIR NIL RATAN, KT., M.A., M.D., <i>Physician</i> . 7, Short Street, Calcutta.
5-8-29	R	Sommerfeld , ALFRED. <i>Merchant</i> . c/o Mousell & Co., Mercantile Buildings, Lall Bazar, Calcutta.
3-9-34	R	Sondhi , VED PALL, M.SC., F.G.S., <i>Assistant Superintendent, Geological Survey of India</i> . 27, Chowringhee, Calcutta.
7-3-23	F	Stamp , L. DUDLEY, B.A., D.SC. University of London, London School of Economics, Houghton Street, London, W.C. 2.
28-9-04	L	*Stapleton , HENRY ERNEST, M.A., B.SC., D.LITT., F.R.A.S.B., <i>Late Director of Public Instruction, Bengal</i> . St. Brelade, Jersey, C.I., England.
5-11-28	N	Statham , R. M., C.I.E., B.A., I.E.S., <i>Director of Public Instruction</i> . Madras.
5-4-37	R	Sufi , M. E., B.A., D.P.H., L.R.C.P.E., L.R.C.S.E., L.F.P.S.G., <i>Assistant Director of Public Health, Bengal (retd.)</i> . 8/A/1, Elliott Lane, Calcutta.
2-6-20	R	Suhrawardy , SIR HASSAN, O.B.E., LT.-COL., KT., M.D., F.R.C.S.I., D.P.H., <i>Chief Medical Officer, E.B. Ry., Late Vice-Chancellor, Calcutta University</i> . 3, Suhrawardy Avenue, Park Circus, Calcutta.
3-3-20	N	Sundararaj , BUNGURU, M.A., F.N.I., PH.D., <i>Director of Fisheries</i> . Chepauk, Madras.
7-11-32	L	Suvarna , SHUMSER JUNG BAHADUR RANA, <i>Major-General in the Nepalese Army</i> . Singha Darbar, Kathmandu, Nepal.
6-4-98	R	Tagore , SIR PRADYOT COOMAR, KT., MAHARAJA BAHADUR. 'Tagore Castle', 12, Prasanna Coomar Tagore Street, Calcutta.
7-11-27	R	Tarkatirtha , BIMALANANDA, <i>Kaviraj, Punditbhusan, Byakaranatirtha</i> . 90/3, Grey Street, Calcutta.
31-8-93	L	Tate , GEORGE PASSMAN. 56, Cantonment, Bareilly, U.P.
1-6-04	L	*Tipper , GEORGE HOWLETT, M.A., F.G.S., M.INST.M.M., F.R.A.S.B. 'The Laurels', Glebe Road, Cambridge, England.
6-6-38	N	Tressler , G. W., M.A., <i>Senior Professor of History and Political Science, Murray College</i> . Sialkot, Punjab.
7-5-28	F	Tucci , GUISEPPE, PH.D., <i>Late Professor of Religions and Philosophy of India and the Far East, University of Rome; Professor of Chinese, University of Naples</i> . Naples, Italy.
5-7-26	A	Tyson , JOHN DAWSON, C.B.E., M.A. (OXON), I.C.S., J.P. c/o U.S. Club, Calcutta.
4-7-27	A	Vance , R. L., M.B., B.C.H., B.A.O. (DUB.), L.M. (ROT.), MAJOR, I.M.S., <i>Officiating Chief Medical Officer, Western India States Agency</i> . Rajkot, Kathiawar.
4-1-37	R	Vedantatirtha , NARENDRA CHANDRA, M.A. (BAGCHI, BHATTACHARJA, SANKHYATIRTHA, MIMAMSATIRTHA, TATTVARATNA. SASTRI), <i>Author and Editor of Books, Secretary and General Editor, 'Calcutta Sanskrit Series'</i> . Metropolitan Printing House.
7-8-33	R	Vedantatirtha , VANAMALI, M.A., <i>Formerly Professor, Cotton College, Gauhati</i> . 8/4-E, Nepal Bhattacharya Lane, Kalighat, Calcutta.

Date of Election.		
5-7-05	R	Vidyabhurshan , AMULYA CHARAN. Vangiya Mahakosha, 5, Jadu Mitter Lane (North), Shambazar, Calcutta.
6-3-01	L	*Vogel , JEAN PHILIPPE, LITT.D., F.R.A.S.B. Noordeind-splein. 4a, Lieden, Holland.
27-9-94	L	Vost , WILLIAM, LT.-COL., I.M.S. 'Woodhurst', Manor Way, South Croydon, Surrey, England.
6-5-25	N	*Wadia , D. N., M.A., B.SC., F.R.G.S., F.N.I., F.R.A.S.B., <i>Government Mineralogist</i> . Torrington Square, Colombo, Ceylon.
5-3-28	N	Waight , HARRY GEORGE, B.A. (OXON and LOND.), F.R.G.S., I.C.S., <i>District and Sessions Judge</i> . Burdwan.
6-2-33	N	Wellsted , THOMAS ARTHUR, A.R.S.M., B.SC., ASSOC. INST. M.M., <i>Mining Engineer</i> . Mansar, P.O. Kandri, Ramtek, C.P.
6-2-33	R	West , WILLIAM DIXON, M.A. (CANTAB.), F.N.I., <i>Assistant Superintendent, Geological Survey of India</i> . 27, Chowringhee, Calcutta.
1-11-26	R	Westcott , FOSS, MOST REVEREND, D.D. (CANTAB.), HONORARY D.D. (OXON), <i>Lord Bishop of Calcutta and Metropolitan of India, Burma and Ceylon</i> . Bishop's House, 51, Chowringhee, Calcutta.
6-4-36	R	White , J. C., <i>American Consulate</i> . 9, Esplanade Mansions, Esplanade, Calcutta.
19-9-06	L	*Whitehead , RICHARD BERTRAM, F.R.A.S.B., I.C.S. (RETD.). 30, Millington Road, Cambridge, England.
6-5-29	A	Williams , HENRY FRENCH FULFORD, M.A., CLARE COLLEGE (CAMB.), <i>Chaplain of Barrackpore</i> . Barrackpore.
7-9-36	R	Williams , N. T., Orr Dignam & Co. 32, Dalhousie Sqr., Calcutta.
6-2-28	F	Williams , T. TALIESIN, M.A., B.SC. 2, Orchard, Welwyn Garden City, Herts., England.
5-4-37	F	Wolfenden , S. N. c/o Security-First National Bank, Beverley Hills Branch, 469, Canyon Drive, California, U.S.A.
1-4-08	R	Wordsworth , WILLIAM CHRISTOPHER, M.A., I.E.S. (RETD.). c/o The 'Statesman', Chowringhee Square, Calcutta.
5-2-19	N	*Yazdani , GHULAM, M.A., F.R.A.S.B., <i>Epigraphist to the Government of India for Persian and Arabic Inscriptions, Hyderabad</i> . Archæological Survey, Hyderabad, Deccan.

ORDINARY MEMBERS.

(Chronological.)

1884.				1906.			
Nov.	5.	Middlemiss, C. S.		Jan.	3.	Chapman, J. A.	
1888.				Sept.	19.	Whitehead, R. B.	
June	6.	Pennell, A. P.		Oct.	31.	Finlow, R. S.	
1890.				1907.			
Mar.	5.	Ray, Sir Prafulla C.		July	3.	Brown, J. C.	25
				"	"	Christie, W. A. K.	
				1908.			
1892.				Jan.	1.	Brahmachari, Sir U. N.	
Jan.	11.	Maclagan Sir Edward D.		April	1.	Wordsworth, W. C.	
1893.				1909.			
5 Aug.	31.	Tate, G. Passman		Jan.	6.	Shirreff, A. G.	
1894.				April	7.	Bentley, C. A.	30
Sept.	27.	Vost, W.		July	7.	Bazaz, R. K.	
1895.				Oct.	6.	Brown, P.	
Sept.	19.	De, K. C.		"	"	Gangoli, O. C.	
1896.				1910.			
Jan.	8.	Burn, Sir Richard		May	4.	Dhavle, S. B.	
1898.				"	"	Kemp, S. W.	35
Jan.	5.	Dods, W. K.		Sept.	7.	Gravely, F. H.	
10 April	6.	Tagore, Sir Pradyot C.					
1900.				1911.			
Dec.	5.	Grieve, J. W. A.		Feb.	1.	Insch, J.	
				"	"	Law, N. N.	
1901.				Mar.	1.	Mahtab, Sir Bijay Chand	
Mar.	6.	Shirwani, H.		June	7.	Chatterjee, K. K.	40
"	"	Vogel, J. P.		"	"	Hosain, M. H.	
June	5.	Mann, H. H.		July	5.	Sewell, R. B. S.	
15 Dec.	4.	Ross, Sir Edward D.		Nov.	1.	Ahmed, K.	
1902.							
July	2.	Doxey, F.		1912.			
1904.				May	1.	Harley, A. H.	
June	1.	Tipper, G. H.		June	5.	Misra, C.	45
Aug.	3.	Fernor, Sir L. L.		July	3.	Andrews, E. A.	
"	"	Stapleton, H. E.		Sept.	4.	Ghosh, T.	
1905.				"	"	Singhi, B. S.	
20 July	5.	Vidyabhusana, A. C.					
Aug.	2.	McCay, D.		1913.			
				Mar.	5.	Simonsen, J. L.	
				April	2.	Calder, C. C.	50
				June	4.	Majumdar, R. C.	
				Nov.	5.	Fox, C. S.	

1914.			
	Mar.	4.	Bacot, J.
	July	1.	Law, S. C.
55	Aug.	5.	Law, B. C.

1915.			
	April	7.	Ohtani, Count K.
	Aug.	4.	Gurner, C. W.
	Oct.	27.	Chatterjee, Sir A.C.

1916.			
	Feb.	2.	Majumdar, N. K.
60	June	7.	Mahajan, S. P.
	July	5.	Sarkar, G.

1917.			
	April	4.	Awati, P. R.
	"	"	Aiyangar, K. V. R.
	Aug.	1.	Bhandarkar, D. R.

1918.			
65	Feb.	6.	Banerji, N. N.
	"	"	Manen, Johan van
	"	"	Singh, B. M.
	April	3.	Prashad, B.

1919.			
	Feb.	5.	Yazdani, G.
70	Mar.	5.	Gupta, S. P.
	Nov.	5.	Hemraj, R.

1920.			
	Mar.	3.	Mahalanobis, P. C.
	"	"	Sundara Raj, B.
	June	2.	Suhrawardy, Sir H.
75	Aug.	4.	Dikshit, K. N.
	Sept.	1.	Chakladar, H. C.
	"	"	Chanda, R. P.
	"	"	Chatterjee, N. C.
	Dec.	"	Akbar Khan, Sir M.

1921.			
80	Jan.	5.	Ray, J. N.
	Feb.	2.	Jain, Chhote Lall
	"	2.	Mukherjee, R. P.
	"	"	Mookherjee, S. C.
	Mar.	2.	Agharkar, S. P.
85	Sept.	7.	Ray, H. C.
	Nov.	2.	Hora, S. L.

1922.			
	Feb.	1.	Chopra, R. N.
	April	5.	Abdul Ali, A. F. M.

1923.			
	Mar.	7.	Labey, G. T.
	"	"	Stamp, L. D. 90
	May	2.	Shebbeare, E. O.
	June	6.	Howard, Sir A.
	"	"	Hutton, J. H.
	Aug.	1.	Biswas, K. P.
	Dec.	5.	Chopra, B. N. 95
	"	"	Barwell, N. F.
	"	"	Sen, H. H. Lakshman

1924.			
	Feb.	6.	Mahindra, K. C.
	Mar.	5.	Banerjee, P. N.
	"	"	Mitter, Sir B. L. 100
	"	"	Sircar, Sir N. R.
	April	2.	Bahl, K. N.
	"	"	Ghose, K.
	"	"	Richards, F. J.
	"	"	Haq, M. M. 105
	"	"	Mitra, J. C.
	May	7.	Bhattacharya, B.
	July	2.	Ray, A. C.
	"	"	Mookerjee, S. P.
	Aug.	6.	Chatterji, S. K. 110
	"	"	Roy Chowdhury, B. K.
	"	"	Davies, L. M.
	Nov.	5.	Chattopadhyay, K. P.
	"	"	Mookerji, B. N.
	Dec.	3.	Newman, Chas. F. 115
	"	"	Pushong, E. S.
	"	"	Basu, J. N.
	"	"	Ghose, S. C.
	"	"	Roerich, G. N.
	"	"	Sen, H. K. 120
	"	"	Khan, R. R.
	"	"	Sarkar, C. K.

1925.			
	Feb.	4.	Guba, B. S.
	Mar.	4.	Benthall, Sir E. C.
	"	"	Das, A. N. 125
	"	"	Deb, K.
	April	1.	Perier, F.
	"	"	Hobbs, H.
	"	"	Sen, B. C.
	May	6.	Wadia, D. N. 130
	July	6.	Bose, M. M.
	Aug.	3.	Pruthi, H. S.
	Nov.	2.	Acharya, P.

	Nov.	2.	Chattopādhyāya, K. C.
135	"	"	Crookshank, H.
	"	"	Kimura, R.
	"	"	Sharif, M.
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1926.			
	Jan.	4.	Shortt, H. E.
	"	"	Sinton, J. A.
140	Feb.	1.	Rao, Y. R.
	"	"	Ghuznavi, Sir A. H.
	"	"	Harris, H. G.
	Mar.	1.	Datta, H. N.
	"	"	Basu, N. K.
145	"	"	Kramrisch, Stella
	"	"	Bagnall, J. F.
	April	5.	Ghose, B. C.
	"	"	Bhatia, M. L.
	"	"	Mitter, K. N.
150	June	6.	Lemmon, R. D.
	July	5.	Mukhopadhyaya, P. K.
	"	"	Tyson, J. D.
	"	"	Lyne, H. W.
	Aug.	2.	Mukherjee, J. N.
155	"	"	Khettry, B.
	Nov.	1.	Jameson, T. B.
	"	"	Modi, J. R. K.
	"	"	Westcott, F.
	"	"	Mills, J. P.
160	"	"	Galstaun, S.
	"	"	Bagchi, P. C.
	Dec.	6.	Aiyangar, S. K.
	"	"	Roy, A. K.
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1927.			
	Jan.	3.	Chakravarty, N.
165	"	"	Bivar, H. G. S.
	Feb.	7.	Chatterjee, A.
	Mar.	7.	Hopkinson, A. J.
	"	"	Bake, A. A.
	"	"	Ghosh, P. N.
170	"	"	Abdul Kadir, A. M. F.
	June	6.	Nandi, Maharaja S. C.
	"	"	Jain, B.
	"	"	Sinha, S. P.
	July	4.	Chatterjee, P. P.
175	"	"	Chakravarti, C.
	"	"	Vance, R. L.
	Nov.	7.	Tarkatirtha, B.
	"	"	Mukherji, D.
	"	"	Brahmachary, S. C.
180	Dec.	5.	Namgyal, H.H. Sir Tashi
	"	"	Dechen, H.H. Kunzang

	Dec.	5.	Chowdhury, Sir C. Mukerjee, S. K.
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1928.			
	Jan.	2.	Basu, N. M.
	"	"	Mello, F. de 185
	Feb.	6.	Sinha, S. C.
	"	"	Ezra, Sir D.
	"	"	Mukerji, Sir M. N.
	"	"	Williams, T. T.
	"	"	Shumsher, Sir Kaiser 190
	Mar.	5.	Waight, H. G.
	"	"	Gooptu, D. N.
	"	"	Neegi, P.
	"	"	Biswas, C. C.
	"	"	Eberl, Otto 195
	April	2.	Mullick, K. C.
	"	"	Chowdhury, Rai J. N.
	"	"	Harris, L. E.
	May	7.	Chatterji, K. N.
	"	"	Chatterjea, Sir N. R. 200
	"	"	Tucci, G.
	"	"	Murray, E. F. O.
	"	"	Ghosai, U. N.
	"	"	Saha, M. N.
	June	4.	Bhadra, S. N. 205
	"	"	Bhattachali, N. K.
	July	2.	Roerich, N.
	Aug.	6.	Jaitly, P. L.
	"	"	Ghuznavi, I. S. K.
	"	"	Heron, A. M. 210
	Nov.	5.	Olpadvala, E. S.
	"	"	Statham, R. M.
	"	"	Reinhart, W.
	"	"	Galstaun, J. C.
<hr/>			
1929.			
	Jan.	7.	Ghose, M. C. 215
	Feb.	4.	Narain, Hirde
	"	"	Jenkins, W. A.
	Mar.	4.	De, J. C.
	"	"	Mullick, P. N.
	April	1.	Ghose, D. P. 220
	"	"	Sen-Gupta, N. C.
	May	6.	Sharma, S. R.
	"	"	Williams, H. F. F.
	July	1.	Dunn, J. A.
	Aug.	5.	Sommerfeld, A. 225
	Nov.	4.	Singh, J.
	"	"	Cotter, G. de P.
	"	"	Campbell, G. R.
	"	"	Siddiqi, M. Z.
	"	"	Mallya, B. G. 230
	Dec.	2.	Fawcus, L. R.
<hr/>			
1930.			
	Jan.	6.	Jain, N. K.
	"	"	Haldar, S. K.

	Jan.	6.	Martin, M. F. C.
235	"	"	Chakraverti, S. C.
	Feb.	3.	Mahtab, U. C.
	"	3.	Chakravarti, M. N.
	Mar.	3.	Ashton, H. S.
	May	5.	Deo, Sir P. C. Bhanj
240	"	"	Matthias, O. G.
	"	"	Mallam, G. L.
	"	"	Cooper, G. A. P.
	June	2.	Kenny, D. E. C.
	Nov.	3.	Austin, G. J.
245	"	"	Rahman, S. K.
	"	"	Newman, C. D.
	Dec.	1.	Roy, K. K.

1931.

	Jan.	5.	Chatterji, D.
	"	"	Evans, P.
250	Feb.	2.	Douglas, G. W.
	"	"	Clough, J.
	Mar.	2.	Bose, S. K.
	April	6.	Bhose, J. C.
	May	4.	Bottomley, J. M.
255	June	1.	Lort-Williams, J.
	Aug.	3.	Barua, K. L.

1932.

	Mar.	7.	Hughes, A.
	"	"	Chakraborty, K. B.
	"	"	Darbari, M. D.
260	Nov.	"	Suvarna Shumser
	"	"	Driver, D. C.
	Dec.	5.	Dutt, N.
	"	"	Boyle, C. A.

1933.

	Jan.	2.	George, J.
265	"	"	Dutch, R. A.
	"	"	Singh, R. P.
	Feb.	6.	Wellsted, T. A.
	"	"	Ghatak, J. C.
	"	"	West, W. D.
270	Mar.	6.	Seal, S. C.
	June	5.	Chakravarti, S. K.
	"	"	Rossetti, F. F. L.
	July	3.	Dutt, G. S.
	Aug.	7.	Singh, Raghubir
275	"	"	Vedantatirtha, V.
	Nov.	6.	Coulson, A. L.

1934.

	Jan.	1.	Ahmad, M. J.
	Feb.	5.	Bhuyan, S. K.
	"	"	Halдар, B. V.

	Feb.	5.	Kirby, W.	280
	"	"	Law, B. C.	
	"	"	Nariman, R. K.	
	"	"	Pasricha, C. L.	
	"	"	Percival, F. G.	
	"	"	Richter, H.	285
	"	"	Sale, H. M.	
	Mar.	5.	Modi, J. J. J.	
	"	"	Singh, H.H. Sir K.	
	May	7.	Bent, W. A.	
	June	4.	Chatterji, B. R.	290
	Aug.	6.	Husain, S. A.	
	"	"	Mullick, M. L.	
	"	"	Rao, U. S.	
	Sep.	3.	Auden, J. B.	
	"	"	Sondhi, V. P.	295
	Nov.	5.	Gee, E. R.	
	"	"	Dey, M.	
	Dec.	3.	Burt, B. C.	
	"	"	Brahmachari, P. N.	
	"	"	Chatterjee, S. C.	300

1935.

	Feb.	4.	Singh, S.	
	"	"	Sarkar, N. R.	
	"	"	Law, P. C.	
	"	"	Lal, R. B.	
	Mar.	4.	Groth, E. M.	305
	June	3.	Singhania, R. P.	
	Aug.	5.	Shattock, J. S. H.	
	Sep.	30.	Dutt, M. N.	
	"	"	Mitter, S. K.	
	Nov.	4.	Bor, N. L.	310
	"	"	Chaudhuri, S. N.	
	"	"	Anina Klebe.	
	"	"	Hirtzel, M. A. F.	

1936.

	Jan.	6.	Brocke, A. G.	
	"	"	Berkely-Hill, O.	315
	Feb.	3.	Flury, E. C.	
	"	"	Catto, Lord	
	"	"	Ahmad, A.	
	Mar.	2.	Chatterji, Mrs. T.	
	"	"	Chatterjee, M.	320
	April	6.	White, J. C.	
	"	"	Rankin, E. H.	
	June	1.	Sen, J. M.	
	Sep.	7.	Williams, N. T.	
	"	"	Ghosh, J.	325
	"	"	Ram, D.	
	"	"	Mandhata, H. C.	
	"	"	Gangooly, P. L.	
	"	"	Bagchi, K. N.	
	Nov.	2.	Bothra, S.	330
	Dec.	9.	Sen, D. N.	
	"	"	Mitra, S. C.	

	Dec.	9.	Gillespie, A. D.
	"	"	Bose, A. N.
335	"	"	Basu, I. B.
	"	"	Banerjee, S. M.

1937.

	Jan.	4.	Vedantatirtha, N. C.
	April	5.	Sufi, M. E.
	"	"	Sharaf-ud-Din, S.
340	"	"	Sattar, A. H.
	"	"	Sahni, M. R.
	"	"	Roy, D.
	"	"	Mooney, H. F.
	"	"	Sen, K. M.
345	"	"	Asari, J. R.
	April	5.	Wolfenden, S. N.
	July	5.	Mozumdar, S.
	"	"	Mukherjee, P.
	Sep.	6.	Halim, A.
350	"	"	Durniz-Podewils, Count
	"	"	Bhattacharya, N. C.

1938.

	Feb.	7.	Chakravarti, P. K.
	April	4.	Chaudhuri, Mrs. R.
	"	"	Anderson, J.
355	May	2.	Faroqui, K. G. M.
	"	"	Mahtab, Maharaj Kumar, A. C.
	"	"	Jacob, J. R.

June	6.	Tressler, G. W.	
"	"	Dudhuria, N. K. S.	
July	4.	Carstairs, A. M.	360
Aug.	1.	Sinha, B.	
"	"	Banerjee, J. N.	
Nov.	1.	Jatia, K. L.	
"	"	Eekhout, Jhr., P. J.	
Dec.	5.	Das Gupta, C. C.	365

1939.

Jan.	2.	Bose, S. M.	
"	"	Ramachandran, T. N.	
Feb.	6.	Basu, J. N.	
"	"	Sinha, A. T. W.	
"	"	Chakravarti, R. M.	370
Mar.	6.	Culshaw, W. J.	
"	"	Sinclair, G. M.	
"	"	Mukerjee, S. C.	
"	"	Meyer, Miss S.	
May	1.	Parker, E.	375
"	"	Ayrton, S. M.	
June	5.	Ali, S. S.	
"	"	Nag, K.	
July	3.	Majumdar, J. M.	
Aug.	7.	Bose, G.	380
Sep.	4.	Ghosh, J. C.	
Oct.	2.	Hasan, Z.	
"	"	Basu Mazoomder, W.	
"	"	Rangarajam, K.	
Dec.	4.	Ray Chowdhury, H. C.	385
"	"	Cameron, A.	

LIFE MEMBERS.

(Chronological.)

	5-11-84	C. S. Middlemiss (30 N.).	7-4-15	Count K. Ohtani (39 F.).	
	6-6-88	A. P. Pennell (88 F.).	5-7-16	G. Sircar (29 N.).	30
	11-1-93	Sir Edward D. MacLagan (94 R.).	6-2-18	Johan van Manen (25 R.).	
	31-7-93	G. P. Tate (23 N.).	3-4-18	B. Prashad (29 R.).	
	27-9-94	W. Vost (94 F.).	2-11-21	S. L. Hora (30 N.).	
	19-9-95	K. C. De (26 R.).	6-6-23	Sir A. Howard (30 N.).	
	5-12-00	J. W. A. Grieve (00 F.).	1-8-23	Kalipada Biswas (36 R.).	35
	6-2-01	J. Ph. Vogel (25 F.).	5-12-23	H. H. Lakshman Sen (24 N.).	
10	2-7-03	F. Doxey (28 R.).	7-5-24	B. Bhattacharya (24 N.).	
	1-6-04	G. H. Tipper (27 N.).	6-8-24	L. M. Davies (24 N.).	
	3-8-04	Sir Lewis L. Fermor (36 N.).	3-12-24	G. Roerich (28 F.).	
	28-9-04	H. E. Stapleton (26 R.).	6-6-27	B. D. Jain (28 R.).	40
	2-8-05	D. McCay (29 F.).	5-12-27	Sir Chhajuram Chow- dhury (27 R.).	
	3-1-06	J. A. Chapman (28 N.).	5-12-27	H. H. Sir Tashi Nam- gyal (27 N.).	
15	19-7-06	R. B. Whitehead (26 N.).	5-12-27	H. H. Kunzang Dech- hen (27 N.).	
	3-7-07	J. Coggin Brown (28 N.).	6-2-28	Sir D. Ezra (28 R.).	
	3-7-07	W. A. K. Christie (29 N.).	6-2-28	Sir Kaiser Shumsher Jung Bahadur Rana (28 N.).	45
	1-1-08	Sir U. N. Brahma- chari (27 R.).	2-7-28	N. Roerich (28 F.).	
	7-4-09	C. A. Bentley (30 N.).	5-11-28	W. Reinhart (28 F.).	
20	4-5-10	S. B. Dhavle (10 N.).	4-11-29	G. de P. Cotter (32 N.).	
	4-5-10	S. W. Kemp (29 F.).	3-3-30	H. S. Ashton (30 N.).	
	1-2-11	James Insch (28 R.).	5-1-31	P. Evans (31 N.).	50
	7-6-11	M. Hidayat Hosain (27 N.).	7-11-32	Suvarna Shumser Jung Bahadur Rana (32 N.).	
	5-7-11	R. B. S. Sewell (28 N.).	6-2-33	J. C. Ghatak (33 R.).	
25	1-11-11	Kamaluddin Ahmad (24 N.).	5-2-34	H. M. Sale (34 N.).	
	5-3-13	J. L. Simonsen (19 N.).	5-3-34	H. H. Sir K. Singh (34 N.).	
	4-3-14	J. Bacot (14 F.).			
	5-8-14	B. C. Law (33 R.).			

SPECIAL ANNIVERSARY HONORARY MEMBERS.

Date of Election.	<i>(Science.)</i>
15-1-34	PROF. ALBERT EINSTEIN, c/o Princeton University, New Jersey, U.S.A.
15-1-34	M. A. LACROIX, Secrétaire Perpetuel, Académie des Sciences Paris.
15-1-34	SIR SYDNEY BURRARD, K.C.S.I., F.R.S., Foxhill, Salisbury Road Farnborough, Hants, England.
15-1-34	DR. SIR SVEN HEDIN, Stockholm, Sweden. _a

(Letters.)

15-1-34	SIR JOHN MARSHALL, KT., c/o Messrs. Grindlay & Co., Ltd. 54, Parliament Street, London.
15-1-34	DR. RABINDRA NATH TAGORE, Santiniketan, Bolpur, Birbhum
15-1-34	PROF. TAHA HOSAIN, Cairo.
15-1-34	PROF. ARTHUR CHRISTENSEN, 62, Raadhustvej, Charlottenlund Denmark.
15-1-34	DR. J. VAN KAN, President, Royal Society of Arts and Letters Batavia, Java.
15-1-34	H.R.H. PRINCE DAMRONG RAJANUBHAB OF SIAM, Siam.

ASSOCIATE MEMBERS.

Date of Election.	
1-2-22	*PIERRE JOHANNIS, REV., S.J., B.LITT. (OXON), <i>Professor of Philosophy</i> . St. Xavier's College, 30, Park Street, Calcutta.
1-2-22	*ANANTAKRISHNA SASTRI, MAHAMAHOPADHYAYA, VEDANTA-VISARADA, <i>Lecturer in Sanskrit, Calcutta University</i> . 32, College Square, Calcutta.
2-12-29	† SARAT CHANDRA ROY, RAI BAHADUR, M.A., B.L., <i>Editor, 'Man in India'</i> . Church Road, Ranchi.
1-1-34	L. DUGIN, <i>Consulate-General for France</i> , 15, Stephen Court, 18, Park Street, Calcutta.
6-3-39	REV. WILLIAM PETTIGREW, 54, Grinsdyke Road, Hatch End, Middlesex, England.
4-12-39	MISS MAUDE LINA WEST CLEGHORN, F.L.S., F.E.S. 43, Moulshat Road, Calcutta.

* Re-elected for a further period of five years on 5-4-1937 under Rule 2c.

† Re-elected for a further period of five years on 6-3-1939 under Rule 2c.

INSTITUTIONAL MEMBERS.

Date of Election.		
28-10-29	Legatum Warnerianum (Oriental Department), University of Leyden, Leyden, Holland.	
2-12-29	Adyar Library, Adyar, Madras S.	
4-5-31	Benares Hindu University Library, Benares.	
1-6-31	Ohtani University Library, Kyoto, Japan.	
7-12-31	Annamalai University Library, Annamalaiagar, Chidambaram, S. India.	5
30-10-33	Allahabad University Library, Allahabad.	
30-4-34	Bombay University Library, Bombay.	
6-1-36	Islamic College, Peshawar.	
4-5-36	Patna College, Patna.	
7-12-36	Forest Research Institute, Dehra Dun.	10
4-1-37	Dacca University, Dacca.	
7-6-37	Agra University, Agra.	

ORDINARY FELLOWS.

Date of Election.		
2-2-10	Sir Prafulla Chandra Ray, KT., C.I.E., M.A., D.SC., F.N.I.	
2-2-10	Sir E. D. Ross, KT., C.I.E., PH.D.	
7-2-12	C. S. Middlemiss, C.I.E., B.A., F.G.S., F.R.S.	
5-2-13	J. Ph. Vogel, PH.D., LITT.D.	
5-2-13	S. W. Kemp, B.A., D.SC., F.R.S.	5
3-2-15	G. H. Tipper, M.A., F.G.S., M.INST.M.M.	
2-2-16	Sir Richard Burn, KT., C.S.I., I.C.S. (<i>retired</i>).	
2-2-16	Sir L. L. Fermor, KT., O.B.E., A.R.S.M., D.SC., F.G.S., M.INST.M.M., F.R.S., F.N.I.	
7-2-17	F. H. Gravely, D.SC., F.N.I.	
6-2-18	J. L. Simonsen, D.SC., F.I.C., F.R.S.	10
6-2-18	D. McCay, M.D., M.R.C.P., I.M.S.	
5-2-19	J. Coggin Brown, O.B.E., M.I.M.E., F.G.S.	
5-2-19	W. A. K. Christie, B.SC., PH.D., M.INST.M.M.	
5-2-19	D. R. Bhandarkar, M.A., PH.D.	
5-2-19	R. B. Seymour Sewell, C.I.E., M.A., SC.D., M.B.O.S., L.R.C.P., F.L.S., F.Z.S., F.R.S., F.N.I., I.M.S.	15
2-2-21	Sir U. N. Brahmachari, KT., M.A., PH.D., M.D., F.S.M.F., F.N.I.	
1-2-22	Ramaprasad Chanda, B.A.	
4-2-25	M. Hidayat Hosain, PH.D.	
7-2-27	Johan van Manen, C.I.E.	
6-2-28	H. E. Stapleton, M.A., D.LITT., B.SC., I.E.S. (<i>retired</i>).	20
6-2-28	B. Prashad, D.SC., F.Z.S., F.R.S.E., F.N.I.	
6-2-28	C. A. Bentley, C.I.E., M.B., D.P.H., D.T.M. & H.	
4-2-29	Sir Albert Howard, KT., C.I.E., M.A.	
4-2-29	J. H. Hutton, C.I.E., M.A., D.SC., I.C.S.	
4-2-29	Sir Edward D. MacLagan, K.C.S.I., K.C.I.E.	25
3-2-30	G. de P. Cotter, B.A., SC.D., M.INST.M.M., F.G.S.	
3-2-30	S. L. Hora, D.SC., F.Z.S., F.R.S.E., F.N.I.	
3-2-30	J. P. Mills, I.C.S., M.A., J.P., F.N.I.	
3-2-30	Meghnad Saha, D.SC., F.R.S., F.N.I.	
2-2-31	S. Krishnaswami Aiyangar, M.A., PH.D., F.R.HIST.S.	30

	Date of Election.	
	2-2-31	R. N. Chopra, C.I.E., M.A., M.D., SC.D., F.N.I., I.M.S.
	2-2-31	R. B. Whitehead, I.C.S. (<i>retired</i>).
	1-2-32	J. Bacot.
35	6-2-33	Percy Brown, A.R.C.A.
	6-2-33	Ordhendra Coomar Gangoly, B.A.
	6-2-33	Ghulam Yazdani, M.A.
	5-2-34	D. N. Wadia, M.A., B.SC., F.R.G.S., F.N.I.
	3-2-36	Suniti Kumar Chatterji, M.A., D.LITT. (LOND.).
	3-2-36	A. M. Heron, D.SC. (EDIN.), F.G.S., F.R.G.S., F.R.S.E., F.N.I.
40	3-2-36	Habib-ur-Rahman Shirwani.
	15-2-37	K. N. Bahl, D.SC., D.PHIL., F.N.I.
	15-2-37	K. N. Dikshit, M.A.
	15-2-37	N. N. Law, M.A., B.L., PH.D.
	15-2-37	J. N. Mukherjee, D.SC. (LOND.), F.C.S. (LOND.), F.N.I.
45	6-2-39	C. S. Fox, D.SC. (BIRM.), M.I.M.E., F.G.S., F.N.I.
	6-2-39	B. S. Guha, M.A., PH.D. (HARVARD), F.N.I.

HONORARY FELLOWS.

	Date of Election.	
	5-2-96	CHARLES ROCKWELL LANMAN. 9, Farring Street, Cambridge, Massachusetts, U.S.A.
	2-3-04	SIR GEORGE ABRAHAM GRIERSON, K.C.I.E., O.M., PH.D., D.LITT., LL.D., F.B.A., I.C.S. (<i>retired</i>). Rathfarnham, Camberley, Surrey, England.
	5-8-15	SIR JOSEPH JOHN THOMSON, KT., O.M., M.A., SC.D., D.SC., LL.D., PH.D., F.R.S. Trinity College, Cambridge, England.
	4-2-20	SIR AUREL STEIN, K.C.I.E., PH.D., D.LITT., D.SC., D.O.L., F.B.A. c/o Indian Institute, Oxford, England.
5	4-2-20	A. FOUCHER, D.LITT. Boulevard Raspail 286, Paris, XVI ^e .
	4-2-20	SIR ARTHUR KEITH, M.D., F.R.C.S., LL.D., F.R.S.A. Royal College of Surgeons of England. Lincoln's Inn Fields, London, W.C. 2.
	4-2-20	R. D. OLDHAM, F.R.S., F.G.S., F.R.G.S. 1, Broomfield Road, Kew, Surrey, England.
	4-2-20	SIR DAVID PRAIN, KT., O.M.G., C.I.E., M.A., M.B., LL.D., F.R.S.E., F.R.S., F.L.S., F.Z.S., M.R.I.A., LT.-COL., I.M.S., <i>Late Superintendent, Royal Botanic Garden, Calcutta, and Director, Botanical Survey of India, and late Director, Royal Botanic Gardens, Kew.</i> Royal Botanic Gardens, Kew, Surrey, England.
	4-2-20	SIR JOSEPH LARMOR, KT., M.P., M.A., D.SC., LL.D., D.C.L., F.R.S., F.R.A.S. St. John's College, Cambridge, England.
10	4-2-20	SIR JAMES FRAZER, KT., D.C.L., LL.D., LITT.D. Trinity College, Cambridge.
	4-2-20	J. TAKAKUSU. Imperial University of Tokyo, Tokyo, Japan.
	2-3-21	F. W. THOMAS, C.I.E., M.A., PH.D., <i>Boden Professor of Sanskrit, University of Oxford.</i> 161, Woodstock Road, Oxford, England.
	7-6-22	SIR THOMAS HOLLAND, K.C.S.I., K.C.I.E., D.SC., F.R.S. <i>Principal, University of Edinburgh, Blackford Brae, Edinburgh.</i>
	7-6-22	SIR LEONARD ROGERS, KT., C.I.E., M.D., B.S., F.R.C.P., F.R.S., I.M.S. 24, Cavendish Square, London, 4.
15	7-1-25	STEN KONOW. Ethnographisk Museum, Oslo, Norway.
	7-3-27	RT. HON'BLE THE EARL OF LYTTON, P.C., G.C.S.I., G.C.I.E. Knebworth, Herts, England.
	5-5-30	DR. R. ROBINSON, D.SC., F.R.S. The Dyson Perrins Laboratory, South Parks Road, Oxford, England.

Date of Election.		
7-2-38	RT. HON'BLE. SIR JOHN ANDERSON, P.C., G.C.B., G.C.I.E., • <i>Lord Privy Seal</i> . 11. Cheapstow Vilas, London, S.W.	
4-9-39	SIR S. RADHAKRISHNAN, K.T., M.A., D.LITT., <i>George V Professor of Philosophy, Calcutta University</i> . P378, Southern Avenue, P.O. Kalighat, Calcutta.	
4-9-39	PROF. DR. HEINRICH LUEDERS, Germany.	20
4-9-39	THE MOST HON. THE MARQUESS OF ZETLAND, P.C., G.C.S.I., G.C.I.E., <i>Secretary of State for India</i> . India Office, White Hall, London, S.W. 1.	
4-9-39	SIR JADUNATH SARKAR, K.T., C.I.E., M.L.C., M.A., D.LITT. 169, Southern Avenue, Kalighat, Calcutta.	

CHANGES IN MEMBERSHIP.

LIST OF MEMBERS WHO HAVE BEEN ABSENT FROM INDIA THREE YEARS AND UPWARDS.*

*Rule 40.—After the lapse of three years from the date of a member leaving India, if no intimation of his wishes shall in the interval have been received by the Society, his name shall be removed from the List of Members.

The following members will be removed from the next Member List of the Society under the operation of the above rule :—

G. W. Douglas.
Dr. Otto Eberl.
R. S. Finlow.
Major D. E. C. Kenny.
H. W. Lyne.
Major R. L. Vance.
R. M. Statham.
Captain G. L. Mallam.
O. G. Matthias.
S. C. Chakravarti.

LOSS OF MEMBERS DURING 1939.

BY RETIREMENT.

Ordinary Members.

1. Shamsuddin Ahmad. (1937.)
2. Satyendra Kumar Basu. (1935.)
3. Vidhusekhara Bhattacharya. (1922.)
4. M. D. Chatterji. (1938.)
5. Gopaldas Chaudhury. (1914.)
6. Seth Krishen Deva. (1938.)
7. B. Dominguez. (1938.)
8. L. Brooke Edwards. (1929.)
9. J. W. McKay. (1926.)
10. Allard Merens. (1938.)
11. S. H. H. Rizvi. (1929.)
12. Edwart von Selzam. (1934.)
13. Hon. B. P. Singh Roy. (1926.)
14. Sir Alfred Henry Watson. (1927.)
15. Madan Gopal Daga. (1936.)
16. B. G. Mookerjee. (1936.)

BY DEATH.

Ordinary Members.

1. Rev. P. O. Bodding. (1893.)
2. Lord Brabourne. (1938.)
3. W. R. Cripser. (1887.)
4. Sir Abdul Kerim Ghuznavi. (1926.)
5. Sir D. M. Hamilton. (1930.)

Honorary Fellow.

1. G. A. Boulenger. (1916.)

UNDER RULE 38.

1. Miss M. L. W. Cleghorn. (1915.)
2. Vinayek Lal Khanna. (1925.)
3. Kumar Krishna Kumar. (1928.)
4. F. M. Wright. (1927.)

MEDALLISTS.

ELLIOTT GOLD MEDAL AND CASH.

RECIPIENTS.

- 1893 Chandra Kanta Basu.
 1895 Yati Bhusana Bhaduri.
 1896 Jnan Saran Chakravarti.
 1897 Sarasi Lal Sarkar.
 1901 Sarasi Lal Sarkar.
 1904 { Sarasi Lal Sarkar.
 Surendra Nath Maitra.
 1907 Akshoy Kumar Mazumdar.
 1911 { Jitendra Nath Rakshit.
 Jatindra Mohan Datta.
 Rasik Lal Datta.
 1913 { Saradakanta Ganguly.
 Nagendra Chandra Nag.
 Nilratan Dhar.
 1918 Bibhutibhushan Dutta.
 1919 Jnanendra Chandra Ghosh.
 1922 Abani Bhusan Datta.
 1923 Bhailal M. Amin.
 1926 Bidhu Bhusan Ray.
 1927 Kalipada Biswas.
 1931 T. C. N. Singh.
 1932 P. N. Das-Gupta.
 1933 Nirmal Kumar Sen.
 1934 D. P. Roy Chowdhury.
 1935 Kalipada Biswas.
 1937 Pulin Behari Sarkar.

BARCLAY MEMORIAL MEDAL.

RECIPIENTS.

- 1901 E. Ernest Green.
 1903 Sir Ronald Ross, KT., K.C.B., C.I.E., K.C.M.G., M.R.C.S., F.R.C.S.,
 D.P.H., LL.D., D.S.C., M.D., F.R.S.
 1905 D. D. Cunningham, C.I.E., F.R.S.
 1907 A. W. Alcock, C.I.E., M.B., LL.D., F.R.S.
 1909 Sir David Prain, KT., C.I.E., C.M.G., M.A., M.B., LL.D., F.R.S.E.,
 F.L.S., F.Z.S., M.B.I.A., F.R.S., LT.-COL., I.M.S.
 1911 Carl Diener.
 1913 William Glen Liston, C.I.E., M.D., D.P.H.
 1915 J. S. Gamble, C.I.E., M.A., F.R.S.
 1917 H. H. Godwin-Austen, F.R.S., F.Z.S., F.R.C.S.
 1919 N. Annandale, C.I.E., D.S.C., C.M.Z.S., F.L.S., F.R.S., F.A.S.B.
 1921 Sir Leonard Rogers, KT., C.I.E., M.D., B.S., F.R.C.P., F.R.C.S.,
 F.R.S.
 1923 Sir Samuel Christophers, KT., C.I.E., O.B.E., F.R.S., F.A.S.B., M.B.,
 LT.-COL., I.M.S.

- 1925 J. Stephenson, C.I.E., B.SC., M.B., CH.B., F.R.S., F.R.C.S., F.R.S.E.,
LT.-COL., I.M.S.
1927 S. W. Kemp, B.A., D.SC., F.R.S., F.A.S.B.
1929 Sir Albert Howard, KT., C.I.E., M.A., F.A.S.B.
1931 R. B. Seymour Sewell, C.I.E., M.A., SC.D. (CANTAB.), M.R.C.S.,
L.R.C.P., F.Z.S., F.L.S., F.R.A.S.B., F.R.S., LT.-COL., I.M.S.
1933 R. Row, O.B.E., D.SC.
1935 B. Sahni, M.A., SC.D. (CANTAB.), D.SC., F.G.S., F.R.A.S.B.
1937 R. N. Chopra, C.I.E., M.A., M.D. (CANTAB.), F.R.A.S.B., BT.-COL.,
I.M.S.

SIR WILLIAM JONES MEMORIAL MEDAL.

RECIPIENTS.

- 1927 Sir Malcolm Watson, KT., LL.D. (HON.), M.D., C.M., D.P.H.
1928 Sir George A. Grierson, K.C.I.E., O.M., PH.D., D.LITT., LL.D., F.B.A.
(HON.), F.R.A.S.B., I.C.S. (*retired*).
1930 Dr. Felix H. D'Herelle.
1932 Dr. C. Snouck Hurgronje.
1934 Rai Sir Upendra Nath Brahmachari, Bahadur, KT., M.A., M.D.,
PH.D., F.S.M.F., F.R.A.S.B.
1937 Prof. Dr. A. J. Wensinek.

ANNANDALE MEMORIAL MEDAL.

RECIPIENTS.

- 1927 Fritz Sarasin.
1930 Dr. Charles Gabriel Seligman, M.D., F.R.C.P., F.R.S.
1933 Dr. Eugène Dubois.
1936 Dr. John Henry Hutton, C.I.E., I.C.S. (*retired*), M.A., D.SC., F.R.A.S.B.

JOY GOBIND LAW MEMORIAL MEDAL.

RECIPIENTS.

- 1929 Max Weber.
1932 Dr. Ernst J. O. Hartert, PH.D.
1935 Prof. Leo Semenowitch Berg.
1938 Dr. Baini Prashad, D.SC., F.Z.S., F.R.S.E., F.R.A.S.B.

PAUL JOHANNES BRÜHL MEMORIAL MEDAL.

RECIPIENTS.

- 1931 Rev. Ethelbert Blatter, S.J.
1934 Isaac Henry Burkill, M.A.
1938 Sir David Prain, KT., C.I.E., C.M.G., M.A., M.B., LL.D., F.R.S.E., F.L.S.,
F.Z.S., M.R.I.A., F.R.S., LT.-COL., I.M.S.

INDIAN SCIENCE CONGRESS MEDAL, CALCUTTA.

RECIPIENTS.

- 1935 Meghnad Saha, D.SC., F.R.S., F.R.A.S.B.
1938 Sir James H. Jeans, D.SC., SC.D., LL.D., F.I.C., F.R.S.

PROCEEDINGS OF THE ORDINARY MONTHLY MEETINGS, 1939.

JANUARY.

An Ordinary Monthly Meeting of the Royal Asiatic Society of Bengal was held on Monday, the 2nd January, 1939, at 5-30 P.M.

PRESENT.

SHAMSU'L 'ULAMĀ' MAULAVI M. HIDAYAT HOSAIN, KHAN BAHADUR, Ph.D., F.R.A.S.B., Joint Philological Secretary, in the Chair.

Members :

Chakravarti, Prof. C.
Chatterjee, Mr. Manomohan
Dugin, Mr. L. S.
Ghosh, Mr. J.

Heron, Dr. A. M.
Klebe-Brandt, Dr. A.
Manen, Mr. Johan van
and others.

Visitors :

Chaudhuri, Dr. J. B.
Das-Gupta, Mr. C. C.

Martyn, Mr. P. D.
Sen-Gupta, Mr. P. C.

The minutes of the last meeting were read and confirmed.

The General Secretary announced receipt of the following ten presentations of books, etc., which had been kept on the table for inspection.

(1-2) From Ananta Krishna Shastri—'Vedanta-Vakksamani', 2 Pts.

(3) From French Consulate General, Calcutta—'Documents Diplomatiques Francais, Ser. 2 and 8'.

(4) From Government of India—'Calendar of the Court minutes of East India Company, 1677-79'.

(5-6) From Royal Asiatic Society, London—'The Rise of the Ottoman Empire, and Three Persian Dialects'.

(7-8) From Government of India—'Further Excavations at Mahenzo Daro', 2 Vols.

(9) From Government Sanskrit College, Benares—Catalogue of Sanskrit MSS., 1918-30.

(10) From R. P. Oliver—'Mricchakatika, the little clay cart'.

The following candidates were balloted for for election as Ordinary Members:—

(1) Bose, Sudhansu Mohan, M.A., LL.B. (Cantab.), Barrister-at-Law, Member, Public Service Commission, Bengal, 3, Federation Street, P.O. Amherst Street, Calcutta.

Proposer: B. N. Chopra.

Seconder: B. S. Guha.

(2) *Ramachandran, T. N., M.A.*, Offg. Superintendent, Archæological Section, Indian Museum, 27, Chowringhee, Calcutta.

Proposer: B. S. Guha.

Seconder: B. N. Chopra.

The General Secretary reported that there had been no loss of membership, since the previous meeting, by death.

The General Secretary reported the following loss of membership, since the previous meeting, by resignation:—

(22) Miss Dr. Grace Stapleton (An Ordinary Member, 1926).

(23) J. W. Holme (An Ordinary Member, 1932).

(24) Mr. Justice R. E. Jack, Kt. (An Ordinary Member, 1935).

(25) M. S. Krishnan (An Ordinary Member, 1933).

(26) J. McPherson (An Ordinary Member, 1924).

(27) Max Staub (An Ordinary Member, 1925).

The General Secretary reported that there had been no lapses of election, since the previous meeting, under Rule 9.

The General Secretary reported that there had been no withdrawals of application, since the previous meeting.

The following papers were read:—

1. P. C. SEN-GUPTA.—*Solstice Days in Vedic Literature.*

The paper consists of two parts in the first of which the author has shown that the Vedic Hindus knew a method for finding the solstice day of any year. In the second half, he has established that there was a standard month of Māgha in the Hindu statements of the solstice days in successive ages, and constructed a chronological ladder extending from 3550 B.C. to 2100 B.C. during which the class of Sanskrit literature known as the Brāhmaṇas was developed.

2. P. C. SEN-GUPTA.—*Bhārata Battle Traditions.*

There are three traditions as to the dates of the Bhārata battle, viz. (1) the Āryabhata tradition, which says that the battle was fought in 3102 B.C. at the beginning of the astronomical Kaliyuga; (2) the Vṛddha-Garga tradition which says that the Yudhiṣṭhira era began from 2449 B.C., and (3) the Puranic tradition or traditions, according to which the interval of time between the birth of Parikṣit and the accession of Mahāpadma Nanda was either 1015, 1050, 1115 or even 1500 years. The author of this paper has already attempted to prove (JRASB, Vol. III, No. 1) that the very first year of the Yudhiṣṭhira era, i.e. 2449 B.C. was the year of the Bhārata battle. In the present paper, he has examined the other two traditions and has argued that both of them are wrong. The paper is divided into two parts in which the Āryabhata tradition and the Puranic evidences are severally discussed.

3. P. C. SEN-GUPTA.—*Madhu-Vidyā or the Science of Spring.*

In this paper, the author attempts to interpret the Madhu-Vidyā, or the Science of Spring of the Vedic Hindus. 'Madhu'

and 'Mādhava' were the two months of spring of the Vedic tropical year, and the author thinks that there is some justification for interpreting 'Madhu-Vidyā' as equivalent to 'Science of Spring'.

The author seeks to establish that the civilization of the Vedic Hindus was earlier than that of the Indus valley as evidenced by the remains at Mohenjo-Daro.

4. P. C. SEN-GUPTA.—*When Indra became Maghavān.*

• The various epithets of Indra. Indra the god of the summer solstice. Transition to the aspect of killer of Vṛtra. Transition to the aspect of Maghavān, the owner of Maghā, a constellation in Leo. Conclusion. Indra as the shedder of rain became Maghavān when he began to function in connection with the heliacal rising of Maghā. Calculations and diagram. The epithets of Śatakratu and Balabhit.

5. ROMA. CHAUDHURI.—*English translation of Nimbārka's Commentary on the Brahmasūtras (Vedānta-pārijāta-Saurabha) and Śrīnivāsa's Commentary on the same (Vedānta-Kaustubha).*

These translations give an English rendering of the commentaries on the Brahmasūtras by Nimbārka and his immediate disciple, Śrīnivāsa. Thus far no English translation of the two works has been attempted, though urgently required in view of the fact that Nimbārka's commentary is one of the five well-known commentaries representing five different schools of the Vedānta. Śrīnivāsa's commentary is not, as generally believed, a sub-commentary on Nimbārka but only elucidates admirably the points of Nimbārka by means of suitable arguments and quotations. Though the translations have been made as literal as possible, it has been attempted to make them at the same time simple and intelligible. The texts used are the Benares editions. Differences of readings in other editions have been given in foot-notes. Nimbārka's readings and interpretations have been compared with those of Śaṅkara. The differences are instructive. Only points of difference have been noted, not the points of agreement.

The following exhibits were shown and commented upon:—

1. A. M. HERON.—*Mica with inclusions.*

Muscovite with inclusions of garnet and interfoliar quartz, albite, hæmatite and rutile altering into titanomorphite.

Garnet is flattened parallel to a trapezohedral face (211) which is also parallel to the cleavageplane of the muscovite. Traces of parting planes parallel to this direction are noted in the garnet. It is of almandine variety.

Quartz.—Clear and transparent, often showing pyramidal faces—flattened—the C-axis being always parallel to the cleavage of the mica.

Also forms a large proportion of the milky white granular portion.

Albite.—A small part of the milky white portion, the rest being quartz.

Thin films of quartz-albite aggregates occur along the planes of foliation of the mica.

Hæmatite, rutile and titanomorphite.—Reddish flakes of hæmatite in linear and dendritic aggregates, often branching at angles of 60° from the main direction. There are also similar aggregates of rutile, often represented by its alteration-product, titanomorphite, and also arranged in parallel directions which follow more or less the directions of the percussion figure.

2. CHINTAHARAN CHAKRAVARTI.—*Manuscripts of a Tantra Work on the Cult of Pañcānana*.

The cult of Pañcānana, the Guardian Deity of children, is immensely popular among the women-folk of West Bengal, who worship the deity for the protection and welfare of their young ones. Almost every village has one or more separate places of worship assigned to this deity. The known literature on this cult, unlike other folk-cults, is, however, extremely meagre. The Royal Asiatic Society of Bengal, fortunately, is in possession of three manuscripts—perhaps all which are known—of a Tantric text called the *Bṛhadrudrayāmala*, sections of which deal exclusively with this cult. These sections, in the manner of *maṅgalakāvya*s of medieval Bengal, one of which may not unlikely have been the basis of the Sanskrit version given here, record legends concerning the powers of the deity in causing destruction when offended and bringing prosperity when duly worshipped. The manuscripts, which were exhibited to the meeting, are especially interesting in view of the fact that Sanskrit works pertaining to folk-cults are rare, if not totally unknown.

The Chairman announced the result of the ballot for the election of Ordinary Members and declared that all the candidates had been duly elected.

The Chairman announced that no meeting of the Medical Section had yet been arranged to be held during the month.

The Chairman announced that the Annual Meeting of the Society would be held on Monday, the 6th February, 1939, and invited the members present to communicate with the General Secretary the names and addresses of non-members to whom they wished invitations to be issued.



FEBRUARY.

An Ordinary Monthly Meeting of the Royal Asiatic Society of Bengal was held on Monday, the 6th February, 1939, immediately after the termination of the Annual Meeting for the election of Ordinary Members and the transaction of business.

PRESENT.

SIR DAVID EZRA, Kt., F.Z.S., M.B.O.U., President, in the Chair.

Members :

Brahmachari, Sir U. N.
Brown, Mr. Percy
Chakravarti, Prof. C.
Groth, Mr. E. M.

Haq, Mr. M. Mahfuz-ul
Mahtab, Maharajadhiraja Sir B. C.
Manen, Mr. Johan van
Pasricha, Major C. L.

White, Mr. J. C.

The minutes of the last meeting were read and confirmed.

The General Secretary announced that the presentations of books, etc., received during the last month would be exhibited at the next Monthly Meeting.

The following candidates were balloted for for election as Ordinary Members:—

(3) *Basu, Jnanendra Nath*, Vidyalankar, Member, Benares Hindu University Court, Fellow, Theosophical Society, Landholder, Director, Messrs. Thacker Spink & Co., 9, Park Lane, Calcutta.

Proposer: Sushil Chandra Ghosh.

Seconder: M. Hidayat Hosain.

(4) *Simeons, Albert Theodore William*, M.D. (Heidelberg), Physician, Khatau Mansion, Cooperage, Bombay.

Proposer: N. Barwell.

Seconder: Johan van Manen.

(5) *Chakravarti, Rash Mohan*, Ph.B., Puranratna, Vidyavinode, Superintendent, Rammala Chhatra Vas, Comilla, Bengal.

Proposer: M. Hidayat Hosain.

Seconder: Suniti Kumar Chatterji.

The General Secretary reported the following loss of membership, since the previous meeting, by death:—

(1) W. R. Criper (An Ordinary Member, 1887).

(2) Rev. P. O. Bodding (An Ordinary Member, 1893, Ordinary Fellow, 1926).

The General Secretary reported the following loss of membership, since the previous meeting, by resignation:—

(1) William Pettigrew (An Ordinary Member, 1930).

(2) Shams-ud-Din Ahmad (An Ordinary Member, 1937).

(3) Seth Krishna Deva (An Ordinary Member, 1938).

The General Secretary reported that there had been no lapses of election, since the previous meeting, under Rule 9.

The General Secretary reported that there had been no withdrawals of application, since the previous meeting.

In accordance with Rule 2(c), the General Secretary announced that the Council recommended for election for a period of five years the following gentleman as an Associate Member of the Society:—

1. Rev. William Pettigrew.

The General Secretary stated the grounds on which the recommendation had been made.

In accordance with Rule 2(c), the General Secretary also announced that the Council recommended for re-election for a further period of five years the following gentlemen as Associate Members of the Society:—

1. Rai Bahadur Sarat Chandra Roy.
2. L. S. Dugin.

The Chairman announced the result of the ballot for the election of Ordinary Members and declared that all the candidates had been duly elected.

The Chairman announced that no meeting of the Medical Section had yet been arranged to be held during the month.

MARCH.

An Ordinary Monthly Meeting of the Royal Asiatic Society of Bengal was held on Monday, the 6th March, 1939, at 5-30 P.M.

PRESENT.

SHAMSU'L 'ULAMA' MAULAVI M. HIDAYAT HOSAIN, KHAN BAHADUR, Ph.D., F.R.A.S.B., Joint Philological Secretary, in the Chair.

Members :

Bagchi, K. N.
Biswas, Dr. K.
Bose, Prof. M. M.
Brown, Mr. Percy
Chakravarti, Prof. C.
Chatterjee, Dr. Manomohan
Dugin, Mr. L. S.

Eekhout, Mr. P. J.
Haq, Mr. M. Mahfuz-ul
Hobbs, Major H.
Manen, Mr. Johan van
Mukherjee, Mr. P. L.
Prashad, Dr. B.
and others.

Visitor :

Das-Gupta, Mr. A.

The minutes of the last meeting were read and confirmed.

The General Secretary announced receipt of the following twenty-five presentations of books, etc., which had been kept on the table for inspection.

- (1-2) From Dr. N. N. Law—'Desh-bidesher Rastriya Kabhoma, 2 vols.'.
- (3) From Fondation de Goije, Leyden—'La Penineuk Iberique'.
- (4) „ University of Dacca—'Ramayana, Adikanda'.
- (5) „ Royal Asiatic Society, London—'Old Iranian Calendars'.
- (6) „ M. Madrolle, Paris—'Siam, from Penang to Aagkor'.
- (7) „ Swami B. H. Bon—'The Geeta'.
- (8-9) From Upsala University—'Die Griechisch-Arabische' and 'Die Jesuspäpste im Neuzettlichen, etc.'.
- (10) From Pandit Hemraj Sharma—'Kashyana Samhita'.
- (11) From Government Oriental Library—'Descriptive Catalogue, Vol. 1'.
- (12) From Director of Public Instruction, Poona—'Bharadvaja Siksha'.
- (13) From Secretary of State for India—'India Office Library Catalogue, Vol. 2, pt. 1'.
- (14) From Department of Education—'Calendar of Persian correspondence, Vol. 6'.
- (15) From Madras Government Oriental Library—'Alphabetical Index of Sanskrit MSS.'.
- (16) From Archaeological Survey of India—'Rajagriha'.
- (17-23) From Tanjore Saraswati Mahal Library—'Descriptive Catalogue of Sanskrit MSS., Vols. 13 to 19'.
- (24-25) From S. N. Das Gupta, Esq.—'Sadbaidyakula-Chaudirka, Printed and MSS., 2 vols.'.

The General Secretary also drew special attention to a collection of 28 volumes on Islamic subjects presented to the Society by one of its oldest members, Mr. G. P. Tate, Bareilly.

The General Secretary announced that the following candidates would be balloted for for election as Ordinary Members:—

(6) *Culshaw, The Rev. Wesley James*, Methodist Minister, P.O. Serenga, Bankura.

Proposer: F. F. Rossetti.

Seconder: A. N. Das.

(7) *Sinclair, Gregg M.*, Director, Oriental Insti., University of Hawaii, Honolulu, Hawaii, U.S.A.

Proposer: B. S. Guha.

Seconder: Baini Prashad.

(8) *Mukerjee, S. C.*, Retired Member of the Indian Civil Service, 25/1, Rowland Road, Calcutta.

Proposer: B. S. Guha.

Seconder: Baini Prashad.

(9) *Meyer, Miss Sally*, M.A., Professor of Botany, Victoria Institution, 11, Sudder Street, Calcutta.

Proposer: Sir David Ezra.

Seconder: K. Biswas.

The General Secretary reported the following loss of membership, since the previous meeting, by death:—

- (3) H.E. Lord Brabourne (Patron, Ordinary Member, 1938).

The General Secretary reported the following loss of membership, since the previous meeting, by resignation:—

- (4) S. H. H. Rizvi (An Ordinary Member, 1929).
- (5) J. W. McKay (An Ordinary Member, 1926).
- (6) V. Bhattacharya (An Ordinary Member, 1922).

The General Secretary reported that there had been no lapses of election, since the previous meeting, under Rule 9.

The General Secretary reported that there had been no withdrawals of application, since the previous meeting.

The General Secretary announced the composition of various Standing Committees of the Society to be as follows:—

Finance Committee :

President	} <i>Ex-officio.</i>
General Secretary	
Treasurer	
Lt.-Col. N. Barwell.	
Dr. Baini Prashad.	
Dr. J. N. Mukherjee.	
Sir U. N. Brahmachari.	
Dr. S. P. Mookherjee.	
Dr. S. C. Law.	
Dr. C. S. Fox.	

Library Committee :

President	} <i>Ex-officio.</i>
General Secretary	
Treasurer	
Philological Secretary.	
Jt. Philological Secretary.	
Physical Science Secretary.	
Biological Secretary.	
Anthropological Secretary.	
Medical Secretary.	
Library Secretary.	

Publication Committee :

President	} <i>Ex-officio.</i>
General Secretary	
Treasurer	
Philological Secretary.	
Jt. Philological Secretary.	
Physical Science Secretary.	
Biological Secretary.	
Anthropological Secretary.	
Medical Secretary.	
Library Secretary.	

In accordance with Rule 38, the General Secretary announced that the names of the following Ordinary Members would be suspended as defaulters within the Society's building for the period of one month to be removed from the Society's registers for non-payment unless the amount due be paid before the next Ordinary Monthly Meeting:—

- 1. Miss M. L. C. Cleghorn.
- 2. Vinayak Lal Khanna.

3. Count Kozui Ohtani.
4. Kumar Krishna Kumar.
5. F. M. Wright.

In accordance with Rule 2(c), the Chairman called for a ballot for the election as an Associate Member for a period of five years of:—

1. Rev. William Pettigrew.

proposed for election in the last Ordinary Monthly Meeting.

In accordance with Rule 2(c), the Chairman called for a ballot for the re-election as Associate Members for a further period of five years of:—

1. Rai Bahadur Sarat Chandra Roy.
2. L. S. Dugin.

proposed for re-election in the last Ordinary Monthly Meeting.

The Chairman announced the results of the ballots for the election of Ordinary Members and Associate Members and declared that all candidates had been duly elected.

The Chairman announced that no meeting of the Medical Section had yet been arranged to be held during the current month.

After the transaction of the above business, on the proposal of the Chairman, the meeting passed the following vote of condolence with the Lady Brabourne on the demise of the Society's late Patron and Member, the Right Hon'ble Lord Brabourne, G.C.S.I., G.C.I.E., M.C.

'This General Meeting of the Royal Asiatic Society of Bengal places on record its sense of deep grief at the death of its late Member and Patron, Lord Brabourne,

It expresses its high appreciation of his gifts, attainments, and character which elicited unstinted respect and affection wherever he went,

It testifies to the Universal recognition of the outstanding manner in which he fulfilled high and responsible duties in the service of both India and the Empire,

It commemorates with gratitude the whole-hearted support given by him to this Society as well as to scholarships generally,

And it conveys its heartfelt condolences to the Lady Brabourne in the irreparable loss of this great and good man.'

Passed unanimously, all present standing.

After the passing of the resolution the meeting was adjourned.



APRIL.

An Ordinary Monthly Meeting of the Royal Asiatic Society of Bengal was held on Monday, the 3rd April, 1939, at 5-30 P.M.

PRESENT.

SIR DAVID EZRA, Kt., F.Z.S., M.B.O.U., President, in the Chair.

Members :

Bose, Mr. M. M.
Chakravarti, Prof. C.
Hobbs, Major H.
Hora, Dr. S. L.

Hosain, Dr. H.
Manen, Mr. Johan van
Neogi, Dr. P.
Olpadvala, Mr. E. S.

The minutes of the last meeting were read and confirmed.

The General Secretary announced receipt of the following sixteen presentations of books, etc., which had been placed on the table for inspection:—

(1-11) From Madras Government Oriental MSS. Library—'Descrip. Cat. of Telugu MSS., Vol. 345 : Triennial Cat. of MSS., Vol. 4, pt. 3, Vol. 5, pt. 2 and Vol. 7, pt. 1; Descrip. Cat. of Kanarese MSS.; Descrip. Cat. of Sans. MSS., Vol. 27; Alphabetical Index of Telugu MSS., Alphabetical Index of Tamil MSS. and Brahmasiddhi'.

(12) From Mysore Govt. Oriental Library—'Tarka Tandavam, Vol. 3'.

(13) „ Government of India—'Library of the India Office'.

(14) „ Colombo Museum—'Catalogue of Palm leaf MSS., Vol. 1'.

(15) „ Royal Asiatic Society of Bengal—'Proc. 25th Indian Science Congress'.

(16) From Local French Consul General—'Documente Di Tomatiques Francaise Ser. 1, T. 8'.

The General Secretary reported that there had been no loss of membership, since the previous meeting, by death.

The General Secretary reported the following loss of membership, since the previous meeting, by resignation:—

(7) S. K. Basu (An Ordinary Member, 1935).

(8) Sir B. P. Singh-Roy (An Ordinary Member, 1936).

The General Secretary reported that there had been no lapses of election, since the previous meeting, under Rule 9.

The General Secretary reported that there had been no withdrawals of application, since the previous meeting.

In accordance with Rule 38, the General Secretary announced that the names of the following Ordinary Members, who had, since the last monthly meeting, been suspended as defaulters within the Society's building, had now been removed as defaulters from the Society's registers for non-payment of dues:—

1. Miss M. L. C. Cleghorn.
2. Vinayak Lal Khanna.
3. Count Kozui Ohtani.
4. Kumar Krishna Kumar.
5. F. M. Wright.

The following paper, in the absence of the author, was taken as read:—

1. M. L. ROONWAL.—*Some recent advances in Insect Embryology, with a complete Bibliography on the subject.*

A brief historical sketch of the development of insect embryology, from olden times until to-day is given. This is followed by an account of some of the recent advances on the subject, the more important items dealt with being: the theory of multi-phased gastrulation; the 7-segmental nature of the insect head; the function of the pleuropodia; the mechanism of blastokinesis; the classification of insectan genital cells; and finally, the origin of some of the body sclerites, viz., the labium and the pleuron. Some embryological problems whose study is likely to give fruitful results are described. A complete and classified bibliography of insect embryology is appended.

The following exhibit was shown and commented upon:—

1. S. L. HORA.—*Two new Exhibits in the Fish Gallery of the Indian Museum.*

The three empty spaces in the corners of the Fish Gallery are being utilized for exhibition purposes by covering them up with panels.

On one of these panels, which will be exhibited, the genealogical history of fishes is depicted in an ascending series of zones, corresponding to the successive geologic ages of the earth's history, and based on the study of fossil fishes and the evidence afforded by the comparative anatomy, development and distribution of the existing forms. The remarkable antiquity of the major subdivisions of fishes is illustrated by the sharks and rays which go as far back as the Silurian Age, several hundred million years ago. The 'Old Ganoids', the 'Lobe-finned Ganoids' and the 'Lung-fishes' evolved from the primitive forms sometime in the Devonian Age. At about the same time as the Amphibians or the first air-breathing vertebrates originated from piscine ancestors. The most dominant class of the present-day fishes—the Teleosts or Bony-fishes—are comparatively very recent: in fact, the Carps and Catfishes originated as late as the Eocene period.

The genealogical tree of fishes is a copy of a similar exhibit in the American Museum of Natural History.

On the second panel is represented an outline classification of the main groups of fishes and one representative form of each group is illustrated.

The panel for the third corner is under preparation and will illustrate the main types of fish used in the control of mosquitoes.

The exhibits are provided with explanatory labels in English and Bengali.

The following communication was made:—

1. CHINTAHARAN CHAKRAVARTI.—*Society's collection of Manuscripts of Works on the Science of Warfare in old India.*

References to the science in old Indian literature. Comparative paucity of old and exclusive literature on the subject. Meagre information about the works that have survived necessitating a careful analysis of the manuscripts available in different Manuscripts Libraries.

Manuscripts belonging to the Society roughly fall under two classes:—

- I. Manuscripts of little-known works on *Dhanurveda*, or the Science of Archery proper.
- II. Manuscripts of more or less familiar astrological and magical works, generally associated with the Tantras, which describe good and bad omens, prescribe magical rites and charms, and ascertain days believed to be auspicious for marching against the enemy.

The Chairman announced that no meeting of the Medical Section had yet been arranged to be held during the month.



MAY.

An Ordinary Monthly Meeting of the Royal Asiatic Society of Bengal was held on Monday, the 1st May, 1939, at 5-30 P.M.

PRESENT.

SIR DAVID EZRA, Kt., F.Z.S., M.B.O.U., President, in the Chair.

Members :

Agharkar, Dr. S. P.
Biswas, Dr. K.
Chakravarti, Prof. C.
Das-Gupta, Mr. C. C.
Fermor, Sir L. L.
Guha, Dr. B. S.

Heron, Dr. A. M.
Hobbs, Major H.
Hosain, Dr. M. H.
Manen, Mr. Johan van
Meyer, Miss S.
Pasricha, Major C. L.

Prashad, Dr. B.

Visitors :

Datta, Mr. J. M.

Mitter, Mr. G.

The minutes of the last meeting were read and confirmed.

The Chairman announced that, as a special arrangement made by the Council in its meeting held on the 24th April, 1939, Dr. B. S. Guha would be the Acting General Secretary of the Society *vice* Mr. Johan van Manen, who had been deputed on special duty, and Dr. Baini Prashad would act as Honorary

Treasurer *vice* Dr. B. S. Guha, who had been acting as Honorary Treasurer in place of Mr. Percy Brown who had gone on leave.

The Acting General Secretary reported receipt of the following ten presentations of books, etc., which had been placed on the table for inspection:—

(1) From Dept. of Public Instruction, Bombay—‘Peterson’s second selection of Hymns from the Rgveda’.

(2) From Pandita Kshama Row—‘Sankarajivanakhyanam’.

(3) „ Government of India—‘Voyage of Nicholas Downton’.

(4) „ Government of Bengal—‘Protozoa: Sporozoa’.

(5) „ Indian Press, Allahabad—‘Tarikh Badshah Begum’.

(6) „ University of Calcutta—‘On the fundamentals of analysis’.

(7) „ The Director of Public Instruction, Poona—‘Tarikh-i-Sind’.

(8) „ H.E.H. Nizam’s Dominion—‘Daft-e-Divani’.

(9-10) From Archæological Dept., Nizam’s Dominion—‘Annual Reports of Archæological Depts., 1934-35 and 1935-36’.

The Acting General Secretary announced that the following candidates would be balloted for election as Ordinary Members:—

(10) *Parker, E.*, Capt., I.A. (Retd.), c/o Remington Rand Inc., 3, Council House Street, Calcutta.

Proposer: Johan van Manen.

Seconder: Percy Brown.

(11) *Ayrton, Shavux Munchershaw*, Assistant, Messrs. Shaw Wallace & Co., Madan Mansions, 275-c, Bowbazar Street, Calcutta.

Proposer: E. S. Olpadvala.

Seconder: Sir David Ezra.

The Acting General Secretary reported that there had been no loss of membership, since the previous meeting, by death.

The Acting General Secretary reported that there had been no loss of membership, since the previous meeting, by resignation.

The Acting General Secretary reported that there had been no lapses of election, since the previous meeting, under Rule 9.

The Acting General Secretary reported that there had been no withdrawals of application, since the previous meeting.

The following papers were read:—

1. S. T. MOSES.—*The Vaghers of Okhamandal*.

The Vaghers are among the earliest inhabitants of the Okhamandal District in the Baroda State. The author, on assuming charge as the Director of Fisheries of the State, first surveyed this District and, among its inhabitants, the historic and interesting community of Vaghers early attracted his attention. During the Pearl Fishery, which was organized more as a relief work for the Vaghers, he was brought into frequent and intimate contact with them. In this paper, he has embodied the information collected about them and the results of his observations.

Introduction—The caste and its traditional origin: (a) from the sweat of god, (b) from the hole where Kashasura was destroyed, and (c) from the sweat of Krishna, to punish Arjuna. Really they are the aboriginal Kshatriyas with a mixture of Rajput races. The name Vagher and its derivations: (a) uncomplimentary name because of tigerlike characteristics, and (b) cooled a god when on a visit to hot Okha and so got the name.

Occupations—Fishing, pearlfishing, piracy and outlawry, agriculture and as coolies, cartmen and guides. Salami tenure in agriculture. Waterdivining and posthumous children. Their food, drink, etc. Dress. Games and entertainments. Speech. Religion. Marriage, divorce, etc.

Physical characteristics—Cranial and nasal measurements.

2. JATINDRA MOHAN DATTA.—*A new and rare Type of Mughal-Pathan found near Calcutta.*

In this paper, the author has described a rare type of sedentary game of Mughal-Pathan, the details of which were collected by him from the village of Dakhineswar and the adjoining locality on the east bank of the Bhagirathi, about 7 miles north of Calcutta.

Description of the game with the help of the standard diagram of Mughal-Pathan.

The following communications were made:—

1. K. BISWAS.—*The Rôle of the Common Algal Communities of the River Hooghly on the Drinking Water of Calcutta.*

The physical, the chemical, and particularly, the biological factors of the river Hooghly, are not at all favourable to sustaining a large number of species of algæ or algal communities. The growth, however, of a few species of the algal communities along the banks of the river within the tidal zone is, by no means, less luxuriant. Four communities of algal vegetation in this portion of the river Ganges can be distinguished:—

- (1) The crustaceous or incrusting community of Caloglossa Leprieurii.
- (2) The struggling community of Cladophora—Rhizoclonium.
- (3) Epiphytic community of Diatoms—Melosira—Terpsinoe.
- (4) Plankton community of (a) Diatom—Synedra—Rhopalodia—Coscinodiscus—Cyclotella, (b) blue-green and green fresh water algæ.

It is the plankton community that plays an important part in the biology of the presettling tanks and filter-beds which form the source of drinking water of Calcutta. Some of the fresh water algæ occurring in the filter-beds in proper proportion,

aid in the purification of the water. Some algæ, on the other hand, act as harmful elements to the filter-beds. Whereas some other species—occurring in crowded masses—choke up the filter-beds within the course of a month during hot days. These are then likely to damage the vital layer of the filter-beds due to their fragmentation and association with the lower animals. At this stage of their life-history these algæ deteriorate the quality of the water of the filter-beds leading to offensive vegetable odour in the drinking water. Again, the water thus surcharged with organic matter becomes a favourable medium for the growth of iron-bacteria during the passage of the water through the underground pipes. These anaerobic iron bacteria when dislodged from the walls of the pipes sometimes come out of the tap water as brownish scum which can be observed in a glass of water after sedimentation.

The pollution of the river Hooghly is so much that they may gradually prove detrimental to organic life and thus complicate the problem of the supply of drinking water and fishes to Calcutta and other parts of India. The delicious Hilsha fish of the river Hooghly are getting less and less every year and may disappear altogether, like Salmon and Trout from the Thames. It is therefore high time that a water pollution research board, like that of England, consisting of a chemist, physicist, botanist, zoologist and engineer, should be formed to carry on researches on water pollution, in its various aspects.

2. B. PRASHAD.—*A historical Note about the Indo-Brahm or the Siwalik River.*

As a result of a study of the Panjab Oil-Belt Sir Edwin Pascoe of the Geological Survey of India published a paper in 1920 in the *Quarterly Journal of the Geological Society of London* in which he postulated the occurrence during the Tertiaries of a westwardly flowing river, the Indo-Brahm, the headwaters of which corresponded with that of the Brahmaputra. Through Assam the river flowed westwards and north-westwards along the foot of the Himalayas as far as North-West Punjab, and then turning southwards along a course not very different from that of the modern Indus, it emptied itself into the Arabian Sea. Almost simultaneously Dr. G. E. Pilgrim of the Geological Survey, from a study of the Siwalik Conglomerates, communicated a paper to the Asiatic Society in which he suggested that there was a single westwardly flowing river, the Siwalik River, in place of the Indus, the Ganges and the Brahmaputra River Systems which served for the drainage both of the eastern and western Himalayas. Both the authors did not refer to the earlier communications by Oldham (1894) and Kobelt (1899) in which similar views had been put forward.

The author gave a brief historical review of the earlier literature on the subject and discussed the zoological evidence

which has been adduced in support of the hypothesis of such a river system.

The Chairman announced the result of the ballot for the election of Ordinary Members and declared that the two candidates had been duly elected.

The Chairman announced that no meeting of the Medical Section had yet been arranged to be held during the current month.



JUNE.

An Ordinary Monthly Meeting of the Royal Asiatic Society of Bengal was held on Monday, the 5th June, 1939, at 5-30 P.M.

PRESENT.

MAJOR HENRY HOBBS, V.D., Ordinary Member, in the Chair.

Members :

Bose, Mr. M. M.
Chakravarti, Prof. C.
Chatterji, Prof. B. R.
Das-Gupta, Mr. C. C.

Eekhout, Mr. P. J.
Guha, Dr. B. S.
Jenkins, Dr. W. S.
Mahtab, Maharaj Kumar A. C.

and others.

Visitors :

Chatterji, Mr. B. K.
Macfarlane, Dr. E. W.

Mitra, Mr. A. K.
Mitra, Mr. D. N.
Mookerjee, Mr. R. R.

The minutes of the last meeting were read and confirmed.

The Acting General Secretary reported receipt of the following thirty-four presentations of books, etc., including twenty-three books from the Afghan Academy, Kabul, which had been placed on the table for inspection :—

- (1) From The Swedish Academy of Sciences—Les Prix Nobel, 1937.
- (2) „ Ganapati Sircar, Esq.—Haraprasad Jivani.
- (3) „ Srinath Sen, Esq.—Truths of Language.
- (4) „ T. E. Notila, Esq.—Syrjanische Chrestomathie.
- (5) „ David Hooper, Esq.—Useful Plants and Drugs from Iran and Iraq.
- (6) „ University of Mysore—‘Catalogue of Books in the library’.
- (7-9) „ P. K. Acharya, Esq.—‘Manasara on Architecture and Sculpture’, ‘Architecture on Manasara’, ‘Architecture on Manasara, illustrating’.
- (10-11) From Parsee Panchayet, Bombay—‘Coins of Tabaristan’, ‘Sind’s changing Map’.
- (12-34) From The Afghan Academy, Kabul—23 publications.

The Acting General Secretary also brought to the notice of the Meeting the following presentations of books, etc., received by the Society some time ago:—

- (1) From The University of Berlin, Germany—807 pamphlets.
- (2) „ Col. Sewell when he left India—57 volumes of books.
- (3) „ Deutsch-Auslandischer Buchtausch—71 packets.

The Acting General Secretary announced that the following two candidates would be balloted for for election as Ordinary Members:—

(12) *Ali, S. Shamsar*, Insurance Underwriter, 3, Bright Street, Ballygunge, Calcutta.

Proposer: B. S. Guha.
 Seconder: Baini Prashad.

(13) *Nag, Kalidas*, M.A. (Cal.), D.Litt. (Paris), Lecturer, Calcutta University, 283, Park Circus, Calcutta.

Proposer: B. S. Guha.
 Seconder: B. N. Chopra.

The Acting General Secretary reported that there had been no loss of membership, since the previous meeting, by death.

The Acting General Secretary reported that there had been no loss of membership, since the previous meeting, by resignation.

The Acting General Secretary reported that there had been no lapses of election, since the previous meeting, under Rule 9.

The Acting General Secretary reported that there had been no withdrawals of application, since the previous meeting.

The Acting General Secretary reported that the Council, since the last Ordinary Monthly Meeting decided to rescind the resolution concerning the removal of the name of Count Kozui Ohtani, from the member-list of the Society under the operation of Rule 38; the name of Count Ohtani has now been re-instated as an Ordinary Member.

The following exhibits were shown and commented upon:—

1. EILEEN W. E. MACFARLANE.—*Marriage Symbols from the West Coast of India. Exhibit of silver replicas of talis of 22 communities from Cochin.*

At weddings on the West Coast a small gold ornament called a *tali*, strung on a cotton thread, is tied around the bride's neck. This is worn until the husband dies. The design of the *tali* varies with the caste. The form most frequently met with among Malayalees is the *Alila tali* or Peepul leaf design. A conventionalized leaf of the holy *Ficus religiosa* L. forms the *tali* motif in eight of the castes in this collection, including the Syrian Christians. There are various other designs including the snake, coin and bead represented. The Goldsmith *tali* seems to be a minute hammer head. That of the Cochin Jews may symbolize the dome on the ruined temple at Jerusalem.

2. B. S. GUHA.—‘*Simphek*’—*The Bark Cloth of the Garos of Assam.*

The making and use of bark cloth is confined to the Matchi and Chisak Garos inhabiting the eastern half of the district. They call it *Simphek* and prepare it from the bark of one of the following trees: (1) Pakram (*Grewia lilice folia*), (2) ‘Prap’ (*Ficus rumphi*), (3) Chram (*Artocarpus Chaplosa*), (4) Dumbri (*Ficus glomorata*), (5) Anisep (*Kydia calycina*). Of these the first yields the best and the last worst kind of *Simphek*. The bark is taken from the main stem of the trees by cutting two rings on the stem about 8’ apart. These are joined by one vertical cut and the bark is split open and pulled off. The outer green layer is carefully removed and the bark is well pounded from the one end to the other running along the fibre with a serrated mallet on a smooth log of wood. It is then doubled over lengthwise and the process of folding and pounding is continued until it is reduced to a thick mass of fibre. The moisture is wrung out and it is dried in the sun unfolded. The requisite length and width are obtained by stitching together two or three pieces, the usual size being 8’ x 2’. The *simphek* is used for blanket or bedding purposes and is never used for wearing by the Garos.

The following communications were made:—

1. R. R. MOOKERJI.—*Two combined Pottery and Basketry Specimens from Upper Assam.*

The occurrence of basketry work as a part of an earthen vessel is extremely rare and the author in his present note describes in detail two such interesting combined pottery and basketry specimens collected from Sadiya in Upper Assam. He identifies them to be strainers and shows the possibility of finding similar type of specimen in Assam, Burma, Yunan, Indo-China and Siam.

2. CHINTAHARAN CHAKRAVARTI.—*A Tantric Story about the Origin of Vijayanagar.*

The story, a very short one, is told in the introductory portions of a little-known Tantra digest called the *Vidyārṇava-tantra* which is attributed to a disciple of Pragalbhācārya. It does not appear to be a version of the many stories already recorded but is apparently a new and independent story by itself.

A manuscript of the work belongs to the Library of the Royal Asiatic Society of Bengal.

The Chairman announced the result of the ballot for the election of Ordinary Members and declared that the two candidates had been duly elected.

The Chairman announced that no meeting of the Medical Section had yet been arranged to be held during the current month.

JULY.

An Ordinary Monthly Meeting of the Royal Asiatic Society of Bengal was held on Monday, the 3rd July, 1939, at 5-30 P.M.

PRESENT.

RAI SIR UPENDRANATH BRAHMACHARI BAHADUR, Kt., M.A., M.D., Ph.D., F.S.M.F., F.R.A.S.B., F.N.I., Medical Secretary, in the Chair.

Members :

Anderson, Mr. J:	Guha, Dr. B. S.
Bose, Mr. H.	Halдар, Mr. R. C.
Bose, Dr. S. M.	Haq, Prof. M. M.
Chakravarti, Prof. C.	Hobbs, Major H.
Chattopadhyaya, Prof. K. P.	Hora, Dr. S. L.
Chaddhuri, Mrs. Roma	Hosain, Dr. M. H.
Cleghorn, Miss M. L.	Prashad, Dr. B.
Das-Gupta, Mr. C. C.	Saha, Dr. M. N.
Eekhout, Jhr.	Siddiqi, Dr. M. Z.
Ghosal, Dr. U. N.	Singhi, Mr. Bahadur Singh
	and others.

Visitors :

Bose, Miss Dipti	Cleghorn, Miss O. C.
Bose, Dr. G.	Gommes, Miss M. L.
	Guha, Mrs. Uma

The minutes of the last meeting were read and confirmed.

In accordance with Rule 45, the Chairman announced the following changes in the constitution of the Council made in one of the Council Meetings held since the last Ordinary Monthly Meeting:—

General Secretary—Dr. B. S. Guha,
vice, Mr. Johan van Manen, resigned.

Anthropological Secretary—Mr. H. C. Chakladar,
vice, Dr. B. S. Guha, appointed General Secretary.

The Chairman announced that these appointments would take effect from to-day, the 3rd July, 1939.

The Chairman announced that in view of the services rendered by Mr. Johan van Manen, to the Society as its General Secretary in the earlier years and also in view of the fact that he is resigning his office about seven months before the expiry of the present term, the Council sanctioned a gratuity of a lump sum of Rs.10,000 to be paid to him as soon as the resignation took effect.

The General Secretary announced receipt of the following ten presentations of books, etc., which had been kept on the table for inspection:—

- (1) From Royal Asiatic Society of Bengal—'Saundarananda Kavyam'.
- (2) „ Cambridge University Press—'Netherlands India'.
- (3) „ Lodd Govindas, Esq.—'Patipujabidhanam'.
- (4) „ Pratul C. Gupta, Esq.—'Baji Rao II and East India Co.'.
- (5) „ Walter Ruben, Esq.—'Sudienzur Textgeschichte des Ramayana'.
- (6) From K. de Vreese, Esq.—'Nilamata'.
- (7) „ Baroda College—Science Dept.—'Compilation of Research Contributions'.
- (8) From Govt. of Bihar, Patna—'Cat. of Arabic and Persian MSS. Oriental Public Library, Bankipore'.
- (9) From Arch. Surv. of India—'Excavations at Paharpur'.
- (10) „ A. A. M. Scharpe—'Bana's Kadambari'.

The General Secretary announced that the following candidate would be balloted for for election as an Ordinary Member:—

- (14) *Majumdar, Jatindra Mohan*, M.A., Deputy Dock Superintendent, Calcutta Port Commissioners, 29, School Row, Bhowanipore, Calcutta.

Proposer: B. S. Guha.

Seconder: S. K. Chatterji.

The General Secretary reported that there had been no loss of memberships, since the previous meeting, by death.

The General Secretary reported that there had been no loss of membership, since the previous meeting, by resignation.

The General Secretary reported that there had been no withdrawals of application, since the previous meeting.

The General Secretary reported that there had been no lapses of election, since the previous meeting, under Rule 9.

The following papers were read:—

1. K. B. ZAFAR HASAN.—*Manuscript copy of the Dīwān of Dārā Shikūh.*

The Manuscript, as its name indicates, is a collection of poems composed by Prince Dārā Shikūh, eldest son of Emperor Shāhjahān. As far as is known, it represents the only copy of the work in existence.

General description of the Manuscript. It consists of 143 *ghazals* with 28 *rubā'iyāt* (quatrains) at the end, arranged in alphabetical order. Written in Shikasta script (running style) on Kashmīrī paper. Colophon at the end, referring to the title of the Manuscript, viz. *Dīwān-i-Dārā Shikūh*, bearing no name of the scribe or the date of transcription.

Short account of Dārā Shikūh. Translation of selected pieces.

The author thinks that the writing must be very old from the nature of the ink used, and that the Manuscript was written at about the same period when the *Dīwān* was composed (middle of the 17th century A.D.).

2. GIRINDRA SEKHAR BOSE.—*Reconstruction of the Āndhra Chronology.*

In this paper the author has made an endeavour for a reconstruction of the chronology of the Āndhras, one of the most important dynasties of ancient Indian history. The scantiness of the data concerning the Āndhras and the difficulty of their interpretation have been a subject of keen controversy among scholars for the last seventy or eighty years without reaching a stage of finality. The author has challenged many of the accepted methods of interpretation in respect of Purāṇic data which had been a veritable stumbling block on the subject.

Contents. Present position of Āndhra chronology. Provincial rulers under the Āndhras. The Āndhra kings. Āndhra time records. Epigraphic evidence. Two groups of data. Purāṇic chronology. The Purāṇic era. Correlation of data. The origin of the Śaka era. Queen Bālaśrī, Queen Jivasutā and Gautamīputra Śrī Śātakarṇi. Queen Nayanikā and Gautamīputra Yajña Śrī Śātakarṇi. Some tentative identifications.

Reconstructed Āndhra Chronology. Chronological history. Reconstructed Āndhra history. The bid for sovereignty. The great Gautamīputra. Provincial governors under Gautamīputra. The Āndhras and the Kushāṇas. The Āndhras as patrons of learning. The end of the Āndhra empire.

The Āndhra empire which began in 21 B.C. came to an end in 435 A.C., having lasted for four centuries and a half. Minor Āndhra princes continued to reign in isolated provinces either as independent kings or as provincial governors under other kings for a long time afterwards. If the date of the Gupta era has been correctly fixed the great Āndhra empire must have shown signs of disintegration with the rise of the Guptas from about 320 A.D.

The following exhibit was shown:—

1. THE GENERAL SECRETARY.—*A Photograph of the late Rev. Fr. H. Hosten, S.J.*

Sir Edward Maclagan, K.C.S.I., a Member and Fellow of the Society has presented a photograph of the late Rev. Fr. H. Hosten, S.J., which he has been able to secure from the relatives of Fr. Hosten in Belgium. The size of the photograph is about 7" × 9".

The late Fr. Hosten was an Associate Member of the Society. He contributed several papers to the *Journal* and *Memoirs*. He died in 1935. The photograph will be preserved in the Society's archives.

The following communication was made:—

1. BAINI PRASHAD.—*An old Letter from James Prinsep.*

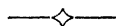
This is a letter written by James Prinsep, one of the Secretaries of the Society in the 19th century, to Dr. W. H. Mill, D.D.,

in connection with a proposal to obtain a bust of Dr. W. H. Mill by Chantrey by public subscriptions. It also contains a reference to the discovery made by Prinsep regarding the mention of the name 'Antiochus, the Great' in certain Asoka edicts. The letter does not bear any date, but from contemporary evidence, traced by Mr. John Robert Seal, Assistant Secretary of the Society, this has been ascertained to be between 7th February and 7th March, 1838.

The letter was presented to the Society by Dr. Clement C. J. Webb, M.A., D.Litt., Pitchcott, England.

The Chairman announced the result of the ballot for election of the Ordinary Member and declared that the candidate had been duly elected.

The Chairman announced that no meeting of the Medical Section had yet been arranged to be held during the month.



AUGUST.

An Ordinary Monthly Meeting of the Royal Asiatic Society of Bengal was held on Monday, the 7th August, 1939, at 5-30 P.M.

PRESENT.

SIR DAVID EZRA, Kt., F.Z.S., M.B.O.U., President, in the Chair.

Members :

Bagchi, Mr. K. M.	Chaudhuri, Mrs. Roma
Basu, Mr. J. N.	Das-Gupta, Mr. C. C.
Biswas, Dr. K.	Guha, Dr. B. S.
Bose, Dr. S. M.	Haq, Prof. M. M.
Brahmachari, Sir U. N.	Hobbs, Major H.
Chakladar, Prof. H. C.	Hora, Dr. S. L.
Chakravarti, Prof. Chintaharan	Hosain, Dr. M. H.
Chatterjee, Dr. S. K.	Rahman, Prof. S. K.

and others.

Visitors :

Bhattacharya, Mr. G. C.	Guha, Mrs. Uma
Bose, Miss Dipti	Navi, Mr. K. K.
Bose, Mr. Mukul Kumar	Roonwal, Dr. M. L.

and others.

The minutes of the last meeting were read and confirmed.

The General Secretary reported receipt of the following thirteen presentations of books, etc., which had been kept on the table for inspection:—

- (1) From Afghan Consulate-General, Simla—'Progressive Afghanistan, Lahore, 1933'.
- (2) From Cresset Press, London—'India'.

(3-4) From Oxford Univ. Press—'The Book of Truthfulness' and 'Al-Hidayatul-Almiriya'.

(5) From Arafat Publication—'Sahih al-Bukhari, Vol. 5'.

(6) „ Hibru University—'Address by the Chancellor of the University'.

(7) From O. C. Gangoly, Esq.—'Antiquity of the Buddha Image'.

(8) „ B. Govinda, Esq.—'The art of Anagarika B. Govinda'.

(9-10) „ Parsee Panchayet—'Mass and Adult Education in India, and allusions and references in Persian Literature'.

(11) From Musee Guinet, Esq.—'L'Iran sons les Sassanides'.

(12) „ Director General, Indian Medical Service—'Indian Medical Review, 1938'.

(13) From Mysore Archæological Dept.—'Annual Report of Mysore Arch. Dept., 1939'.

The General Secretary announced that the following candidates would be balloted for for election as Ordinary Members :—

(15) *Helland, Bernhard Alvin*, M.A. (Minnesota), B.D. (Augsburg Seminary, U.S.A.), Missionary, Principal, Kaerabani Boys' Middle English and Guru Training School, Kaerabani via Dumka, S.P.

Proposer: B. S. Guha.

Seconder: Baini Prashad.

(16) *Bose, Girindra Sekhar*, M.B., D.Sc., Professor of Psychology and Head of Dept. of Psychology, Calcutta University, 14, Parsi Bagan Lane, P.O. Amherst Street, Calcutta.

Proposer: B. S. Guha.

Seconder: Baini Prashad.

The General Secretary reported the following loss of membership, since the previous meeting, by death :—

(4) Dr. G. F. Boulenger (An Honorary Fellow, 1916).

(5) Alhadji, Sir A. K. Ghuznavi (An Ordinary Member, 1926).

The General Secretary reported the following loss of membership, since the previous meeting, by resignation :—

(9) M. D. Chatterji (An Ordinary Member, 1938).

(10) Sir A. H. Watson (An Ordinary Member, 1928).

(11) B. Dominguez (An Ordinary Member, 1938).

The General Secretary reported that there had been no lapses of election, since the previous meeting, under Rule 9.

The General Secretary reported that there had been no withdrawals of application, since the previous meeting.

In accordance with Rules 2 and 13, the Chairman announced that the Council, since the last Ordinary Monthly Meeting, had recommended the election as Honorary Fellows of the Society of :—

1. Sir Sarvapalli Radhakrishnan, Kt.

2. The Most Hon. the Marquess of Zetland.

3. Prof. Dr. H. Lueders.

4. Sir Jadunath Sarkar, Kt.

The Chairman called upon the General Secretary to state the grounds on which (1) Sir S. Radhakrishnan, and (2) The Marquess of Zetland had been recommended.

The General Secretary spoke as follows about these two nominees in support of the Council's recommendation for election as Honorary Fellows of the Society:—

1. SIR SARVAPALLI RADHAKRISHNAN.

'In recommending the name of Prof. Sir Sarvapalli Radhakrishnan for the Honorary Fellowship of the Royal Asiatic Society, the Hon. General Secretary remarked that he needed no introduction to the members of the Society. He was the Haskell Lecturer in Comparative Religion in the University of Chicago in 1926 and the Hibbert Lecturer in 1929. He succeeded Sir J. C. Bose as India's representative on the Intellectual Committee of the League of Nations and was recently appointed to the newly created chair on Eastern Religion and Ethics founded by Mr. Spalding in the University of Oxford. His lectures before the Academic bodies in various parts of the world have marked him out as the greatest cultural ambassador of India. Among his chief contributions may be mentioned the *Reign of Religion in Contemporary Philosophy* (1920), *Indian Philosophy* in two volumes (1923–27), an *Idealistic View of Life* (1932) and *Eastern Religions and Western Thought* (1939).

Prof. Sir Radhakrishnan was for some time the Vice-Chancellor of the Andhra University. He has been for a long time the George V Professor of Philosophy in the Calcutta University and still adorns that chair in conjunction with the Spalding Professorship of the Oxford University. He has lately been made a Fellow of the British Academy being the first Indian to get this coveted distinction.'

2. THE MARQUESS OF ZETLAND.

'The Marquess of Zetland, P.C., G.C.S.I., G.C.I.E., is a politician, administrator, scholar and traveller of international reputation, and needs no introduction to the members of the Society. He was Governor of Bengal from 1917–1922.

He was educated at Harrow and Trinity College, Cambridge, and has travelled extensively in Ceylon, India, Persia, Asiatic Turkey, Central Asia, Siberia, Japan, China, and Burma.

Some of the most important appointments held by him are:—

Member, Royal Commission on the Public Services in India, 1912–14.

Governor of Bengal, 1917–22.

President, Royal Geographical Society, 1922–25 and now he is a Trustee.

President, India Society, and President, Royal Asiatic Society, 1928–31.

Member, Indian Round Table Conference, 1930–31.

Secretary of State for India, since 1935 and Secretary of State for Burma, since 1937.

M.P. for Hornsey Division, Middlesex, 1907–16.

He has earned the following academic distinctions :—

Hon. LL.D. (Cambridge); Hon. D.Litt. (Leeds); Hon. LL.D. (Glasgow); and he is a Fellow of the British Academy.

I mention the following few of his most important publications :—

Sport and Politics under an Eastern Sky, 1902.

On the Outskirts of Empire in Asia, 1904.

A Wandering Student in the Far West, 1908.

An Eastern Miscellany, 1911.

Lands of the Thunderbolt, Sikkim, Chumbi, and Bhutan, 1923.

India, A Bird's Eye-View, 1924.

The Heart of Aryavarta, 1925. (He was awarded the gold medal of the Royal Empire Society for this book.)

The Life of Lord Curzon, 1928.

Letters of Disraeli to Lady Bradford and Lady Chesterfield, 1929.

The Life of Lord Cromer, 1932.

Steps towards Indian Home Rule, 1935.'

The Chairman then called upon Dr. S. K. Chatterji to state the grounds on which (3) Prof. Dr. Lueders and (4) Sir Jadunath Sarkar had been recommended.

Dr. S. K. Chatterji then spoke as follows about these two nominees in support of the Council's recommendations for election as Honorary Fellows of the Society :—

3. PROFESSOR HEINRICH LUEDERS.

'Prof. Heinrich Lueders is the *doyen* of Indologists in Germany, whose name is honoured wherever the ancient literature and civilization of India and Central Asia are studied. He is a master of the subject, great as an original investigator and great as a teacher, who has made notable contributions to our knowledge of many branches of Indology—language, literature, epigraphy, history, linguistics and mental and material outlines in their various aspects. Central Asia, as a part of a Greater India of 2,000 to 1,500 years ago with its remains of Indian art, literature and general civilization, has been for him a field of studies as much as the classic soil of India. The fragments of Sanskrit MSS. in palm-leaf discovered from Central Asia and studied by him with unique patience and labour coupled with his vast erudition have yielded to him and to the scholarly world much valuable information about Sanskrit and Prakrit in the early centuries of the Christian era, information which is of far-reaching consequence in the study of Indo-Aryan language and literature in early times. He has given us the right orientation about the origin and antecedents of Pali, and about the primitive Buddhist canon which is behind that

presented by the Pali texts. Dr. Lueders is one of the founders of Central Asian studies, involving the newly discovered languages, Indo-Aryan (Prakrit), Iranian (old Khotanese and Sogdian), and Tokharian (old Kuchean and old Qarashahrian), and the series of articles on Indian and Central Asian topics as well as monographs and books he has contributed are as varied in their subjects as they are important and conclusive in their results.

Till recently, Dr. Lueders was Professor in the University of Berlin. He still continues to be in close touch with the Prussian Academy of Arts and Sciences, which is one of the premier learned associations of the world. Among other things, he is at present occupied in a new interpretation of Vedic texts. Some years ago Dr. Lueders visited India, and among other places he came to Calcutta where he lectured before the University.

I have had the good fortune of meeting Dr. Lueders on several occasions in Germany, in 1922, 1935 and 1938, and in India when he visited the country in 1936. Dr. Lueders belongs to a generation of scholars who seem to stand head above shoulders beside the present line of investigators, when we consider the extent and depth of their erudition, the sweep of their scientific imagination and their uncanny power of work. In honouring such a man, the Royal Asiatic Society of Bengal will only honour itself: and I recommend most heartily that the Society do elect him to an Honorary Fellowship.'

4. SIR JADUNATH SARKAR.

'Sir Jadunath Sarkar, Kt., C.I.E., M.A., D.Litt., is a historian, a scholar of wide reputation and needs no introduction to the members of this Society. He was educated at the Rajshahi College and the Presidency College, Calcutta. He was a member of the Indian Educational Service from which he retired in 1932. He held many important appointments, amongst which are:—

University Professor of Modern Indian History, Hindu University, Benares.

Sir W. Meyer Lecturer, Madras University.

Reader in Indian History, Patna University.

Vice-Chancellor, Calcutta University, 1926-28.

He is an Honorary Member of the Royal Asiatic Society of Great Britain, a member of the Indian Historical Record Commission and a corresponding member of the Royal Historical Society and the Italian Institute of the Middle and Extreme East. He won the Premchand Roychand Studentship, Menat Gold Medal, and the Griffith's Prize, Calcutta University, and the Sir James Campbell Gold Medal, Bombay Branch of the Royal Asiatic Society of Great Britain. He was a member of the Legislative Council, Bengal, from 1929 to 1932.

His publications include :—

India of Aurangzeb—Statistics, Topography and Roads (1901).^{*}

History of Aurangzeb, 5 volumes.

Shivaji and His Times.

Studies in Mughal India.

Anecdotes of Aurangzeb.

Chaitanya : His Life and Teachings.

• Economics of British India.

India through the ages.

Fall of the Mughal Empire, 3 volumes.

He also edited and continued W. Irvine's Later Mughals, 2 volumes; and edited the Poona Residency Records.^{*}

The following paper was read :—

1. M. Hidayat Hosain.—*The Conquest of Sholāpūr by Burhān Nizām Shāh I* (914–961 A.H., 1508–1553 A.D.) as described by Shāh Tāhīr.

- In this paper, the author has given a short history of the conquest of Sholāpūr in the Bombay Presidency by Burhān Nizām Shāh I in 1548 A.D. from a Manuscript in Persian written by Shāh Tāhīr who lived in the 16th century. From Tārikh Firishta it is found that Shāh Tāhīr was a descendant of Khwāndī Sayyids who traced their origin from the Fātimid Caliphs of Egypt (A.D. 909–1171). While Burhān Nizām was king of Ahmadnagar, Tāhīr was living in Goa. His reputation as a great Islamic scholar reached the ears of the king of Ahmadnagar, who sent for him, and Tāhīr subsequently became a great favourite and trusted friend of the king. It is recorded that the king had sent him on various political missions to the courts of Gujrāt, Khāndesh, Bijāpūr, and Golconda.

From the treatise of Shāh Tāhīr it is gathered that the territory of Sholāpūr was under the sway of Burhān Nizām Shāh I, king of Ahmadnagar, before it became part of the Mughal empire. It is seen from this article that Burhān Nizām Shāh had made four attempts to capture Sholāpūr and succeeded in his fourth attempt.

The treatise gives a description of the fourth attack as follows :—

In 955 A.H. (1548 A.D.), Burhān Nizām Shāh renewed and further strengthened the bonds of alliance with Rāmraj Rāo of Bijānagar. He sent many valuable presents to him and met him on the border of Rāichūr, where it was decided that Rāmraj should attack the forts of Rāichūr and Madkal, while he himself should proceed against the forts of Sholāpūr and Gulbarga. Reinforced by a detachment of troops of Rāmraj, Burhān Nizām Shāh advanced towards the fort of Sholāpūr and surrounded

it. He secured the services of Chilpī Rūmī Khān, gunner of the Sultān Bahādur of Gujrāt, who bombarded the fort continuously for three months and at last reduced it. Burhān Nizām Shāh did not think it advisable to proceed to Gulbarga, but returned to Aḥmadnagar.

It appears from the text, that the Manuscript was written by Shāh Tāhir as commanded by Nizām Shāh and copies of the treatise were distributed to other kings of the country for information. It is written in Persian, and only a single copy of it is so far known to exist and is preserved in the Bankipore Library. The Manuscript is therefore unique in itself.

The following exhibits were shown and commented upon:—

1. JHR. P. J. EEKHOUT.—*A Tibetan Banner.*

The Tibetan banner exhibited was obtained by the exhibitor from a Lama at Khatmandu, Nepal, which he visited last month. It is a *tanka*, or a banner that is generally used by Lamas for religious rites and ceremonies,—especially by the Tibetan Buddhists of the Red Sect or Nyingmapas. It is customary for these Lamas to hang this *tanka* on the wall of houses or altars when they worship and make their offerings.

The banner contains eleven figures painted in various colours, of which the figure of Avalokitesvara occupies the centre. He has four hands and is depicted watching over all beings with his merciful eye. The other figures are those of Manjusri, Dorje Sempa, Buddha Sakyamuni, Dorje Sempa (this is painted differently from the other), Padma Sambhava, Tara, Vajrapani and two Red Sect Lamas. In addition to these, there are mystical prayers *Om ma ni pad me hum*, together with the figure of a Naga worshipping the above gods.

The banner is old and important for iconographic purposes, and is of great artistic value.

2. M. Hidayat Hosain.—*Qānūn-i-Humāyūnī, or Humāyūn Nāma.*

This is a work giving a vivid account of the rules and ordinances promulgated by Emperor Humāyūn in his empire, and of the buildings that were erected by him. It is therefore an important treatise as it deals with the administrative system that was prevalent in the early Mughal period.

Sources of information regarding the systems of administration which prevailed during the reigns of Bābur and Humāyūn, and the political ideas and the ideals which moulded and shaped those systems, are various, of which references are found in works of contemporary writers. One of the outstanding contemporaries of Bābur and Humāyūn was that illustrious court historian, Khwānd Mir, who is the author of *Humāyūn Nāma*. From the life-history of this historian, we find that he was attached to the Courts of Bābur and Humāyūn for several years. His book

therefore is not a mere diary of events, or a compilation of historical tales, but is a storehouse of information regarding the conditions of the country during the prosperous reign of the Emperor Humāyūn. The author of the treatise was a careful observer of facts and events which came under his notice, and composed it after a thorough grasp of essential principles as well as the minute details of government. The author was himself a practical statesman and his work bears the impress of a political mind through and through.

Short historical sketch of the author.—Kh^wānd Mir was the court historian of the Emperor Humāyūn. He was born in Herāt in A.D. 1475. He came to India, in 1528, while Bābur was the Mughal Emperor. He presented himself before the Emperor and was admitted to his court. In A.D. 1529, Kh^wānd Mir accompanied Bābur to Bengal and was with him at the *Trimohini*, or the confluence of the Sarajū and the Ganges. After the death of Bābur (1530 A.D.), he served his son, the Emperor Humāyūn, till the end of his life. He was in the train of Humāyūn's military expedition to Gujrāt where he breathed his last in 1534 A.D. His name is recorded as a famous court historian and author of several historical works by his biographers.

There is only one Manuscript copy of *Humāyūn Nāma* in existence, and it is preserved in the British Museum. The exhibitor has been able to obtain a rotograph copy of the Manuscript from the authorities of the Museum which is exhibited here. The Council of the Royal Asiatic Society of Bengal has decided to have this treatise edited and published by him in the *Bibliotheca Indica* series, for which he has obtained permission from the Trustees of the British Museum also.

The following communication was made:—

1. S. L. HORA.—*Observations on the Abundance of Hilsa Crop this year.*

Sir K. G. Gupta and later writers on the fisheries of Bengal were generally of the opinion that *Hilsa* is becoming scarce and recommended the establishment of hatching stations to introduce artificial propagation for replenishing the rivers of Bengal. Further, it is still fresh in our memory that the *Hilsa* crop was very poor in 1937 and 1938. Its great abundance in 1939, therefore, has come as a pleasant surprise to the fish-eating population of Bengal and consequently this fact has received considerable attention in the public press. In explaining the probable causes for this unexpected increase in the yield of the fishery for this year, the author gives a brief account of the life-history and the periodic rise and fall in the annual yield of the *Hilsa* fishery.

The Chairman announced the result of the ballot for the election of Ordinary Members and declared that the two candidates had been duly elected.



SEPTEMBER.

An Ordinary Monthly Meeting of the Royal Asiatic Society of Bengal was held on Monday, the 4th September, 1939, at 5-30 P.M.

PRESENT.

DR. BAINI PRASHAD, ESQ., D.Sc., F.Z.S., F.R.S.E., F.R.A.S.B., Biological Secretary, in the Chair.

Members :

Agharkar, Dr. S. P.
Chakladar, Prof. H. C.
Chakravarti, Prof. C.
Ezra, Sir David

Guha, Dr. B. S.
Haq, Prof. M. M.
Hobbs, Major H.
Mukherjee, Dr. J. N.
Rahman, Prof. S. K.

Visitors :

Osman, Md.

Rao, Dr. H. S.

The minutes of the last meeting were read and confirmed.

The General Secretary reported receipt of the following thirteen presentations of books, etc., which had been placed on the table for inspection :—

- (1) From Govt. of Madras—'South Indian Inscriptions, Vol. 9, pt. 1'.
- (2) " Folklore Society, London—'British Calendar Customs'.
- (3-4) " Govt. of Bengal—'Butterflies, Vol. 1', 'Mammalia, Vol. 1'.
- (5) " Govt. of India—'Voyage of P. A. Cabral to Brazil, etc.'.
- (6) " Toyo Bunko, Tokyo—'Chinese Dress and Personal Ornaments'.
- (7-11) From University Library, Lund—'Resperches sur la valeur des traditions, etc.', 'Studien zur einer Osterkischen, etc.', 'Book of the Himarites', 'Le livre des splendeurs' and 'The Nirukta'.
- (12) From American Council of Learned Societies—'Bulletin No. 28'.
- (13) " Dr. K. Biswas—'Handbook of Common Water and Marsh Plants'.

The General Secretary announced that the following candidate would be balloted for for election as an Ordinary Member :—

- (17) *Ghosh, J. C.*, D.Sc., F.N.I., Director, Indian Institute of Science, Bangalore.

Proposer: J. N. Mukherjee.

Seconder: M. N. Saha.

The General Secretary reported the following loss of membership, since the previous meeting, by resignation :—

- (12) Dr. E. von Selzam (An Ordinary Member, 1934).
- (13) Gopal Das Chaudhury (An Ordinary Member, 1914).
- (14) A. Merens (An Ordinary Member, 1938).

The General Secretary reported that there had been no loss of membership, since the previous meeting, by death.

The Chairman called upon Mr. M. Mahfuz-ul Haq to read an obituary notice of the late Alhadji Sir A. K. Ghuznavi, an Ordinary Member of the Society from 1926 to 1939, written by Dr. M. Hidayat Hosain (vide page 200).

The Chairman read an obituary notice of the late Dr. George Albert Boulenger, an Hon. Fellow of the Society from 1916 to 1937, written by Mr. Roonwal (vide page 201).

The General Secretary reported that there had been no lapses of election, since the previous meeting.

The General Secretary reported that there had been no withdrawals of application, since the previous meeting.

The General Secretary reported that since the last Ordinary Monthly Meeting the Council had appointed with effect from 1-8-1939, Mr. Trin Chen, as a special assistant for looking after the Sino-Tibetan section of the Society's library and publications in the grade of Rs.50-3-80, and five additional menial servants in the grade of Rs.15-1-19. The Council had also, after careful consideration of the recommendations of the Special Committee, adopted the scales of pay recommended for various members of staff and defined their duties.

In accordance with Rule 48(a), the General Secretary reported that the Council, since the last Ordinary Monthly Meeting, had recommended the following changes to be made in the existing Regulations regarding the Election of Fellows, R.A.S.B. :—

(a) In Regulation No. 7, the second sentence, reading :

‘Up to and including the date of the meeting of Fellows mentioned in Regulation 8, any Fellow shall be at liberty to add his signature, or to authorize in writing the General Secretary to add his name, in support of any candidate already nominated by two Fellows,’ should be deleted, and that the Regulation should consist of only the first sentence, reading :—

‘The returned nomination papers shall be open to inspection by any Fellow in the Society's Rooms.’

(b) The Regulation No. 8, should consist of only the first para., reading :—

‘There shall be a meeting of Fellows within the fortnight preceding the 7th of October, one week's notice of which shall be given to the Resident Fellows. At this meeting matters of concern to the Fellows shall be generally considered and the returned nomination papers shall be scrutinized. It shall be competent to the meeting to remedy any technical faults to

prevent invalidation on this account alone' and that the second para., reading :

'If valid nominations have been returned for more than the maximum number of new Fellows to be elected those nominations which have received the greatest number of signatures shall be selected for inclusion in a list printed as a voting paper, to a number one higher than the total number to be elected. In the event of a tie for such selection, the Fellows present at the meeting, shall decide which of the nominees having obtained the same number of signatures shall be so selected,' should be deleted.

The General Secretary also announced that these amendments to the above Regulations would take effect from the 1st of January, 1940.

In accordance with Rules 2 and 13, the Chairman called for a ballot for election as Honorary Fellows of the Society of:—

1. Sir S. Radhakrishnan, Kt.
2. The Most Hon. the Marquess of Zetland,
3. Prof. Dr. H. Lueders, and
4. Sir Jadunath Sarkar, Kt.

whose names had been proposed for election in the last Ordinary Monthly Meeting.

The following papers were read:—

1. L. S. DUGIN.—*The Songs of the Elder of Herat* (translated from the Russian of V. Zhukovsky).

Abū Ismā'il 'Abdullāh ibn Abī Manṣūr Muḥammad al-Anṣārī al-Heravī was born on the 2nd of Sha'ban 396 A.H. (1005 A.D.) at Herat, to which place his ancestors had come in the days of caliph 'Usmān with the latter's famous general Aḥnaf b. Qays. When he was still quite young, Anṣārī showed already an extraordinary aptitude for making verses. Endowed with a remarkable memory and an uncommon zeal for study, he studied theology and jurisprudence (*fiqh*) under the guidance of many prominent shaykhs of his time. His profound learning acquired for him the title of Shaykhu-l-Islām. He devoted himself more specially to collecting traditions, of which he is said to have collected 300,000 and to have been able to quote an appropriate tradition for the most trifling incidents of the daily life.

In the path of mystic life he was the disciple of Abū-l-Ḥasan Kharāqānī.

His poetry is mystico-didactic. The best known of his works is the *Munājāt*, which has even been printed in India. Of his other works of which *Hājī Khalfa* enumerates ten titles, and *Rizā-Qulī-Khān* mentions one, only two works in Arabic: *Manāzil-u-s-sā'irīn* and *Ḥammū-l-kalām* have reached us under their original titles. A copy of the Persian *Tabaqāt*, which served as the principal source for *Jāmī*, *Nafahātu-l-Uns*, and

was for a long time considered as lost, exists in the possession of the Society and has been described in detail in the Society's Catalogue of Persian MSS.

The songs edited in the present article have been called by *Zhukovsky* from the Persian pseudo-*Manāzilū-s-sā'irīn*, which in his opinion, is probably the work referred to as *Anwāru-t-tahqīq* by *Rizā-Qulī-Khān*.

2. CAPT. L. MUNN.—*A sword dance and skewer-piercing ceremony at Tintini.*

The following exhibit was shown and commented upon:—

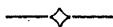
1. H. S. RAO.—*The King Crab.*

The king crab is a curious marine creature which has lived through millions of years up to the present time practically unchanged in its general morphological features. Its closest allies are probably among the scorpions and prawn-like crustaceans, but may not be classed with the groups to which these belong. It has a wide distribution along the Indo-Malayan, Chinese and Japanese coasts and along the East coast of North and Central America. There are two species of king crabs which inhabit the East coast of India. One is essentially marine and lives on a sandy or muddy bottom up to a depth of 20 fathoms while the other is mainly estuarine ascending the River Hughli as far as Calcutta. In the breeding period of the marine species which corresponds to the close of the cold weather in Bengal and Orissa king crabs may be seen in pairs, the male—which is smaller in size than the female—has the second and third pairs of limbs of the front part of the body modified as a clasper, holding firmly on to the shield-like back of the female.

The Chairman announced the results of the ballots for the election of the Ordinary Member and Honorary Fellows, and declared that all the candidates had been duly elected.

The Chairman announced that unless special notice be given there would be no Ordinary Monthly Meeting during the recess month of October.

The Chairman announced that unless special notice be given there will be no meeting of the Medical Section in October.



NOVEMBER.

An Ordinary Monthly Meeting of the Royal Asiatic Society of Bengal was held on Monday, the 6th November, 1939, at 5-30 P.M.

PRESENT.

SIR DAVID EZRA, Kt., F.Z.S., M.B.O.U., President, in the Chair.

Members :

Bagchi, Mr. K. N.
Brown, Mr. Percy
Dugin, Mr. L. S.
Ghose, Mr. S. C.
Ghoshal, Dr. U. N.
Guha, Dr. B. S.

Hobbs, Major H.
Pasricha, Major C. L.
Rossetti, Mr. F. F.
Saha, Dr. M. N.
Vidyabhusana, Mr. A.
White, Mr. J. C.

Visitors :

Cleghorn, Miss O.
Das, Mr. K. N.
Dutta, Mr. K. S.
Ezra, Lady R.

Job, Mr. P. J.
Kader, Miss Lily I.
Macfarlane, Dr. E. W.
Seal, Mrs. C.

Spensor, Dr. D.

The minutes of the last meeting were read and confirmed.

The General Secretary reported receipt of the following fourteen presentations of books, etc., which had been placed on the table for inspection :—

(1) From Kern Institute, Leyden—'Annual Bibliography of Indian Archaeology, 12, 1937'.

(2) From Royal Asiatic Society of Bengal—'Tabaqat-i-Akbari, Eng., Vol. 3, pt. 1'.

(3) From Archaeological Surv. of India—'Kausambi in Ancient Literature'.

(4) From Archaeological Surv. of India—'Cat. of Coins in the Indian Museum, Supplement to Vol. 3'.

(5) From Patna University—'Psychological Attitude of Early Buddhist Philosophy'.

(6) From Govt. of Bombay—'English Records of Marhatta History'.

(7) „ S. K. Das, Esq.—'Kriper Sastra Arthaveda'.

(8) „ Arch. Surv. of India—'Suppl. to Vol. 2, Cat. of Coins'.

(9) „ Govt. of Bihar—'Index to Catalogue Raisonne of the Persian MSS. in Oriental Public Library of Bankipore'.

(10) From L. Bogdanov—'Les cantes du Perroquet'.

(11) „ Dr. J. B. Chaudhuri—'Sanskrit Poetesses, Part A'.

(12) „ Govt. of India—'Md. Hist. Record Commissions—Proc. and Records of Meetings, Vol. 15'.

(13) From Principal, Khalsa College, Amritsar—'Maharaja Ranjit Singh Centenary Volume'.

(14) From Trustees of Gibb Memorial—'Tabaqat Al-Shu'ara al-Muhdathin of Ibn Al-Mutaz'.

The General Secretary announced that the following candidates had been elected Ordinary Members, during the recess months, under Rule 7 :—

(18) *Hasan, Khan Bahadur Maulvi Zafar*, Superintendent, Archaeological Survey, Northern Circle, Agra.

Proposer: B. S. Guha.

Seconder: Baini Prashad.

(19) *Bose, Dr. Ajit Mohan*, M.B., Ch.B. (Edin.), Medical Practitioner, 86, Ballygunge Place, Calcutta.

Proposer: B. S. Guha.

Seconder: Baini Prasad.

(20) *Basu, Mazoomder, Wooshacur*, B.L., M.R.A.S., F.R.S.A. (Lond.), Bengal Civil Service (Judicial), Munsiff, Barisal, Dist. Bakarganj (Bengal).

Proposer: B. S. Guha.

Seconder: Baini Prasad.

(21) *Bastin, Reginald Walter*, I.C.S., Settlement Officer, Mymensingh, E.B. Rly.

Proposer: B. S. Guha.

Seconder: Baini Prasad.

(22) *Rangarajam, Krishnaswami*, Employee, I.C.I. (India) Ltd., Madras, Rukmani Building, Mambalam, West Madras.

Proposer: B. S. Guha.

Seconder: M. Hidayat Hosain.

(23) *Ram, Rai Bahadur Diwan Khilandu*, Advocate. Lower High Court, Multan, Punjab.

Proposer: Baini Prasad.

Seconder: B. S. Guha.

In accordance with Rule 2(c) the General Secretary announced that the Council had recommended for election for a period of five years, the following lady as an Associate Member of the Society:—

Miss M. L. W. Cleghorn, F.L.S., F.E.S.

The General Secretary stated the grounds on which the recommendation had been made.

The General Secretary reported that there had been no loss of membership, since the previous meeting, by resignation.

The General Secretary reported that there had been no loss of membership, since the previous meeting, by death.

The General Secretary reported that there had been no lapses of election, since the previous meeting.

The General Secretary announced that there had been no withdrawals of application, since the previous meeting.

The following papers were read:—

1. MISS R. GRACE LEWISON.—*Folk-lore of the Assamese*.

The authoress has collected over a long period about forty folk-stories related to her by the people with whom she has come into contact during her work amongst them. None of these have hitherto been published. They are very varied in character and are related for different reasons. The more common ones serve the purpose of reminding the children of the consequences of unwise actions. Others are handed down from generation

to generation to bring out the purpose and meaning of the festivals. Those dealing with animals are mainly for amusement only, but also often reveal something of the intimacies of family life. The women folk are the main purveyors of these stories which to a certain extent regulate the home life as well as preserving the customs and the beliefs of their religion.

In the absence of the author the paper was read by the Assistant Secretary.

2. D. CHATTERJEE.—*Studies on the Endemic Flora of India and Burma.*

The present paper makes a survey of the distribution of Indian Plants (Dicotyledons) in a detailed manner. The relationship of the various groups of Indian plants with the surrounding countries and the nature of invasion of foreign plants to India and other special features have been discussed thoroughly in Section VII. Further a modified map showing the Phytogeographical regions of India based on various factors has been presented by the author.

In a continental area it is unusual to find a high degree of endemism but 61·5 per cent of Indian plants has been found to be endemic. A possible explanation based mainly on the theory of isolation has been put forward in the present case. The endemic species have been found in high concentration in three regions: (a) The Himalayas, (b) South India, and (c) Burma.

In the absence of the author the paper was read by Dr. E. W. Macfarlane.

3. E. W. GUDGER.—*The Alleged Pugnacity of the Swordfish and the Spearfishes as shown by their attacks on Vessels.* (A Study of their Behaviour and of the Structures which make possible these Attacks.)

The author gives a detailed historical account from literature, widespread both in time and space, of the attacks by swordfishes and spearfishes on ships and boats. He deals with the attacks chronologically, by regions, as such attacks have been recorded from almost all parts of the three central oceans. The accounts of the earlier authors are given verbatim, omitting irrelevant matter, so that the reader may get a general idea of the extensive literature on the subject. A detailed bibliography and excellent illustrations accompany the monographic paper.

In the absence of the author the paper was read by Mr. K. N. Das.

The following communication was made:—

1. MAJOR H. HOBBS.—J. A. Hicky '*Bengal Gazette—1780-82*'.

The first English newspaper in Bengal was founded by James Hicky under the title of '*THE BENGAL GAZETTE*, or

CALCUTTA ADVERTISER' which made its first appearance about the end of January 1780. No complete file of the paper is known to be in existence. In a bound volume my earliest number is 10 but it contains the Prospectus which promised much, particularly that 'No Anecdote, *Personal or Domestic*, that can possibly convey the smallest offence to any single individual, shall ever be inserted', and the Editor pledges himself, 'that the most attentive caution shall be observed on this Point'.

In those days it must have been almost impossible to comment on any public matter without touching on some abuse. Firm believers that conscience is a good servant but a bad master, Hicky's public was shamelessly on the make so there were more than enough abuses to go round. Greed and unscrupulous rapacity were rampant, and, fortified by jealousy—the greatest of all littleness—quarrels were bitter in the extreme.

On June 18, 1781, there were four criminal prosecutions and one civil suit for damages against Hicky. Two of these were for libel against Warren Hastings, one brought by the Rev. J. Z. Kiernander, and the civil suit for damages was also by Warren Hastings.

Kiernander was bitterly hated by Hicky who showed up the commercial side of that missionary's character, proving Hicky's contention that Kiernander was one of those who come out to do good and stay to do well.

Bengal Past and Present states, 'A most effectual mode was taken by Mr. Hastings to prevent the circulation of some abusive paragraphs in this paper, by sending an order to the Post Office to prevent any newspaper or parcel from Mr. Hicky being received or carried by dak'.

The following exhibit was shown and commented upon:—

1. SIR DAVID EZRA—*A Chameleon.*

The Chameleon or Ground Lion belongs to a sub-order of the Lizard family. It is so called because it looks peculiarly ferocious when molested or disturbed. It hisses like a snake, a characteristic uncommon amongst lizards except for the Gecko family commonly found in the houses of Calcutta. It pretends to bite with open mouth, but actually never does so. It has four distinct characteristic features:—

(1) A tongue which is capable of stretching out 14 inches. The exhibit, shown to-day, caught an insect on the wing at a distance of about 14 inches away.

(2) It has peculiar eyes; lids which are uncommon in the lizard family and eyes which are capable of independent movement.

(3) It has a prehensile tail—somewhat similar to the American monkey or the Indian Hanuman monkey.

(4) It has a foot structure different from all animals on earth—the action of the toe is somewhat like that of the dentist's forceps.

It has no clavicle.

It can change colour. The exhibitor has seen this species changing colour from green to light green; to black; grey; yellow; yellow and black, etc. Red and purple are absent.

There are 50 species of Chameleon: most of them are found in Africa, South of the Sahara, and Madagascar. They are also found in western Mediterranean countries and in Andalusia and Algeria. The one exhibited at the meeting was found in Madura. They are also found in many other parts of India. The exhibitor has seen them in Pachmari and Rajnandgaon.

The Chameleon is essentially arboreal in its habits. It is insectivorous, and is fond of flies of which it consumes large numbers. It lays eggs in damp places.

The exhibit was shown not from the scientific point of view, as that was well-known, but from the point of view of Nature.

Mr. F. F. Rossetti also explained a similar exhibit.

The Chairman announced that no meeting of the Medical Section had yet been arranged to be held during the month.



DECEMBER.

An Ordinary Monthly Meeting of the Royal Asiatic Society of Bengal was held on Monday, the 4th December, 1939, at 5-30 P.M.

PRESENT.

SHAMSU'L 'ULAMĀ' MAULAVI M. HIDAYAT HOSAIN, KHAN BAHADUR, Ph.D., F.R.A.S.B., Joint Philological Secretary, in the Chair.

Members :

Brown, Mr. Percy
Chakravarti, Prof. C.
Chakravarti, Mr. P. K.
Ghoshal, Dr. U. N.
Guha, Dr. B. S.
Haq, Prof. M. Mahfuz-ul

Hobbs, Major H.
Hora, Dr. S. L.
Prashad, Dr. B.
Rahman, Prof. S. K.
Roy, Dr. H. C.
Saha, Dr. M. N.
West, Mr. W. D.

Visitors :

Hilali, Mr. G. M.
Sukul, Mr. L.

Nag, Mr. U.
Osman, Md.
Roonwal, Dr. M. L.

The minutes of the last meeting were read and confirmed.

The General Secretary reported receipt of the following fifteen presentations of books, etc., which had been kept on the table for inspection :—

- (1) From Mr. P. E. Pieris—'The Sinhala, the last phase'.
- (2) „ The Director General of Archæology—'Progress of Archæology in India during the past 25 years'.
- (3) From The Govt. of India—'Report on the work of the Archæological Survey of India'.
- (4) From Mr. L. S. Dugin—'Les Contes de Perroquet, etc.'.
- (5) „ Royal Asiatic Society—'Feudalism in Egypt, Syria, etc.'.
- (6) „ Swedish Academy of Sciences—'Les Prix Nobel 1938'.
- (7) „ Dr. Fritz Sarasin—'Reisen und Foroechangen in Ceylon'.
- (8) „ K. A. Nilakanta Shastri—'Foreign notices of South India from Megasthenes, etc.'.
- (9) From Shri Darbar Sahib Committee—'Gurbani Vayakaran'.
- (10) „ Royal Asiatic Society of Bengal—'Rubaiyat of 'Umar-i-Khayyam'.
- (11) From Commogic Inst. of Washington—'Studies on the Ice Age in India, etc.'.
- (12) From T. S. B. H. Von—'Veder Parichaya'.
- (13) „ Calcutta University—'Bhasa Prakas'.
- (14) „ Sir S. Radhakrishnan—'Mahatma Gandhi'.
- (15) „ Royal Asiatic Society of Bengal—'Manu-smriti, Vol. 2'.

The General Secretary announced that the following candidates would be balloted for for election as Ordinary Members :—

(24) *Bose, Debendra Mohan*, M.A., Ph.D., F.N.I., Director, Bose Research Institute, 93, Upper Circular Road, Calcutta.

Proposer: M. Hidayat Hosain.

Seconder: Baini Prashad.

(25) *Ray Chowdhury, H. C.*, Carmichael Professor of Ancient Indian History and Culture, Calcutta University, 6, Mysore Road, Kalighat, Calcutta.

Proposer: M. N. Saha.

Seconder: B. S. Guha.

(26) *Mukerjee, Jyotish Chandra*, Chief Executive Officer, Calcutta Corporation, 28, Camac Street, Calcutta.

Proposer: B. S. Guha.

Seconder: Baini Prashad.

(27) *Cameron, Rev. Allan*, M.A., B.D., Principal, Scottish Church College, 3 & 4, Cornwallis Street, Calcutta.

Proposer: Baini Prashad.

Seconder: M. Hidayat Hosain.

The General Secretary reported that there had been no loss of membership, since the previous meeting, by death.

The General Secretary reported the following receipt of news of the death of a former member of the Society :—

Mesroby J. Seth (An Ordinary Member of the Society from 1897 to 1938).

The General Secretary reported that there had been no loss of membership, since the previous meeting, by resignation.

The General Secretary reported that there had been no withdrawals of application, since the previous meeting.

In accordance with Rule 40, the General Secretary reported that the names of the following Ordinary Members would be removed from the next memberlist of the Society :—

- | | |
|---------------------------|-------------------------|
| (1) G. W. Douglas. | (6) Major R. L. Vance. |
| (2) Dr. Otto Eberl. | (7) R. M. Statham. |
| (3) R. S. Finlow. | (8) Capt. G. L. Mallam. |
| (4) Major D. E. C. Kenny. | (9) O. G. Matthias. |
| (5) H. W. Lyne. | (10) S. C. Chakravarti. |

In accordance with Rules 2 and 13, the Chairman called for a ballot for the election of—

Miss M. L. W. Cleghorn

who had been proposed for election in the last Ordinary Monthly Meeting as an Associate Member for a period of five years.

The following papers were read :—

1. BAINI PRASHAD.—‘*Tabaqāt-i-Akbarī, Eng. Trans., Vol. III.*’

The paper deals with the life of Nizām-ud-dīn Aḥmad, the author of the *Tabaqāt-i-Akbarī* which gives an account of the history of India up to the end of the 38th year of Akbar’s reign. After dealing with the sources of the *Tabaqāt-i-Akbarī* and discussing the relative importance of the various works, it is shown that the *Tabaqāt* was based on all the available historical works of the time and was the source from which later historians drew their material. The literary and historic importance of the work was also briefly reviewed.

2. GHULAM MUSTAFA MALIK.—*The food of the Mountain Barbel Oreinus McClelland, and its probable bearing on the Introduction of Brown Trout in Himalayan Streams.*

Attention was directed to Mitchell’s observations regarding the destruction of the Mountain Barbels of the genus *Oreinus* from the Kashmir trout-streams in relation to the growth of Brown Trout. The feeding habits and food of *Oreinus* were described and an analysis of the gut contents of 131 specimens of *Oreinus* from Chitral, Kagan Sub-division of the Hazara District, and Afghanistan was given. It was concluded that Brown Trout, a carnivorous fish, flourishes well in association with *Oreinus*, as the latter keeps the streams clean of the vegetable growth and other deleterious matter and thereby encourages the growth of insect larvæ that inhabit rocks and stones and form the food of Brown Trout. Further, its fry provide food for the trout during the season when insects which form its normal diet are scarce.

No definite data were available about the food of Rainbow Trout in Himalayan waters, and it was therefore difficult to assess

its influence on the indigenous fish-fauna of the streams of this area.

In view of the above a plea was made for a thorough biological investigation of the local waters before any exotic species was introduced.

3. GHULAM MUSTAFA MALIK.—*Cases of mortality of Brown Trout, Salmo trutta fario Linn., in the Hatcheries of the Hazara District, N.W.F. Province.*

From an examination of the material in the collection of the Zoological Survey of India, the author discussed the cases of mortality of the Brown Trout in the Jabori and Shinu hatcheries of the Hazara District, N.W.F. Province. Short description of the two hatcheries and the results of *post mortem* examination of the various cases were given.

In the case of Jabori hatchery the mortality was traced to excessive growth of algæ and to the development of thyroid tumours or goitre. The death of trout in Shinu hatchery was attributed to malstripping and malnutrition. An interesting case of visceral abnormality was also described. Remedial measures were suggested, and in the case of trout in the Shinu hatchery, it was concluded that some of the deaths at least could have been prevented by the employment of better trained staff for manipulation during stripping and by feeding the fish on a suitable diet.

The following communication was made:—

1. CHINTAHARAN CHAKRAVARTI.—*Sanskrit works of Sāhib Kaula.*

Sāhib Kaula, which seems to be a Tantric ecclesiastical designation in Kashmir, is a peculiar and rather unique title. A person occupying the position in the 17th century, who called himself *Mahāmāheśvarācārya* and *Sāhibkaulānandanātha*, was the author of several Sanskrit works of which the Royal Asiatic Society of Bengal possesses the manuscripts of three. A manuscript of a fourth work, the *Kalpavṛkṣa* composed in 1733 V.S., is reported to be in the possession of Pandit Madhusudan Kaul, Superintendent of Archæology, Kashmir, who claims to be a descendant of this illustrious personage. Of the works, of which manuscripts are possessed by the Society, the *Śrīvidyā-nityapūjāpaddhati* is a big ritualistic work dealing with the details of the worship of Tripurā. The other two are panegyrical poems eulogizing the Divine Mother. Of these the *Sārikāstava* is a small hymn to the goddess Sārikā, while the *Devīnāmaṭilāsa*, composed in 1723 V.S., is a work in 16 chapters, dealing with 1,000 names of the Divine Mother. Besides these, several stray verses of Sāhib Kaula are also found in the manuscript containing the *Sārikāstava*.

The present author is evidently different from Sāhebrām or Sāhibrām of the 19th century whose works are referred to by Aufrecht in his *Catalogus Catalogorum* (I. 716, II. 171).

The Chairman called upon the following to show and explain his exhibit :—

1. BAINI PRASHAD.—*Bhowal Copper-plate Inscription of Lakshmana Sena.*

HISTORY OF PLATE.

Mr. Walters, who was Magistrate of Dacca-during the early part of last century, obtained a copper-plate of Lakshmana Sena—the Bhowal plate—from Golucknarain Rac, and presented it to the Asiatic Society, Calcutta. This presentation was announced at the May meeting of the Asiatic Society of 1829, and a reference to it was included in the proceedings of the Society for that month published in 'Gleanings in Science', and also in the 'Calcutta Gazette', dated May 14, 1829. Presumably the plate was taken to England by Mr. H. H. Wilson, who was the Secretary of the Asiatic Society up to 1832, and who, after his retirement, was appointed Librarian of India House.

No further reference to the plate has been traced until 1875 when a short account of it was published by Navinachandra Bhadra in his 'Bhoyaler itihasa', 1875. In 1927 Dr. Nalini Kanta Bhattasali gave full details about it in an article in the 'Indian Historical Quarterly'.

The plate was thought to have been lost until June of this year when Dr. H. N. Randle, Librarian of the India Office, published an account of some copper-plates which he had discovered in a safe in the India Office, and suggested that one of these was presumably the lost Bhowal plate.

Dr. N. K. Bhattasali immediately directed the attention of the Royal Asiatic Society of Bengal to this discovery. The Society thereupon raised the question of ownership with the Library authorities at the India Office, who, after investigation of all the available evidence, admitted the Society's claim.

Meanwhile, owing to the war, it was not considered safe to send the plate out to India, Sir John Arthur Herbert, then Governor-designate of Bengal, however, offered to bring it out with him, and through his kindness it has now been received back in Calcutta. This is of particular importance as scholars will now be able to have early access to the plate itself, and check the reading of the inscription, photographs of which, together with a critical account are being published in 'Epigraphica Indica'.

FIND-SPOT.

Mr. Walter's account of the find-spot of the plate is as follows:—'About thirty miles north of the city of Dacca, a few

miles above the site of the ancient fortress of Akdala, and a short distance from the banks of the river Luckiah, is situated Mowza Rajabary, appertaining to the pergunah Bhowal, and included in the modern division of "thannah" Jamalpore. At this place, on the crest of a low hill, stands an ancient building called Moggee's Mut (Maghir Matha). About forty years ago (i.e. about 1790) the accompanying copper-tablet was dug up by a Koonch ryot, at a short distance from the "mut". It was conveyed to the Bhowal zemindar, Luckhenarain Rae, from whose son, Golucknarain Rae it has now been obtained

• DESCRIPTION OF PLATE.

It is a single plate measuring $13\frac{3}{4}$ by 12 inches, weighing 7 lbs., and having 59 lines incised upon it, 30 on the obverse and 29 on the reverse. A projection from the top edge, in the shape of an inverted shield or heart, carries the usual Sena device, the image of Sadasiva, 3 inches in diameter, fixed by a stout central bolt almost $\frac{1}{2}$ inch in diameter which projects about $\frac{1}{2}$ inch on the reverse

REPORT OF INSCRIPTION.

The deed was issued by the 'Maharajadhiraja Ariraja-Madanāsankara' Lakshmanasenadeva (lines 28 and 57-8). The name of the place of issue has been doubtfully read in the Madhainagar grant as Dharyyagrama. In the present plate it is again doubtful (line 24). The grant is dated the sixth day of the month Karttika in the (regnal) year 27, and was executed by Sabkaradhara, the 'Gauda-Mahasandhivigrahika' as 'duta' (lines 57-59).

It is a conveyance of land to Padmanabhadeva Sarman Pathaka . . . The motive of the gift is to win merit for the 'Mahadevi' (Queen) . . . padevi and the 'Mahadevi' Kalyanadevi (line 48).

The land conveyed consists of two adjacent estates, of the annual value of 400 'kapardaka puranas', in the Paundra-varhdhana bhukti.

DATE OF INSCRIPTION.

The date of the inscription, if Lakshmana Sena's reign was c. 1170-1200 A.D. must be fixed at c. 1197 A.D., and therefore very near the time of his overthrow by Muhammad Bakhtiyar.

The Chairman announced the result of the ballot for the election of Ordinary Members and an Associate Member and declared that all candidates had been elected.

OBITUARY NOTICES.

THE HON'BLE ALHADJI NAWAB BAHADUR SIR ABDELKERIM
ABU AHMED KHAN OF DILDUAR.

(1872-1939.)

The death of Sir Abdelkerim in his sixty-seventh year removes from Bengal and especially from the Muslim Community one of the greatest Muslim leaders which Bengal has produced. He was born on 25th August, 1872, and was educated at St. Peter's School, Exmouth, Devonshire. At an early age sent to a public school in England and appeared at the I.C.S. examination in 1890, after which finished his career in the Universities of Oxford and Jena; he travelled almost all over the continent of Europe, where a number of years were spent for education purposes in Germany, France and Italy; he returned to India in 1894 and settled on his estates handed down by his ancestors Fatehdad Khan Ghuznin Lohani, the last independent Afghan chieftain of Bengal. He represented the whole of East Bengal and Assam in both Muslim and Hindu interests in the old Imperial Legislative Council, from 1909-12 and the whole of Bengal in Muslim interest in Viceroy's Council, 1913-16. He went on a political mission to the Court of ex-King Hussein of Hedjaz as well as to Palestine and Syria to enquire into the question of Pilgrim Traffic, 1913. He was exempted from Indian Arms Act in 1925, and was President of Bengal Simon Committees in 1929. He visited as estate guest the Court of King Abn Saoud of the Hedjaz and Nejd; thereafter travelled extensively in Sudan, Egypt, Palestine, Syria and Iraq in order to study irrigation problems and other matters connected with the constitution of these countries. He was created Knight in 1928 and Nawab Bahadur in 1933; was a member of the Executive Council of the Governor of Bengal since 1934. He was the author of several works of which the following may be mentioned:—(1) Pilgrim Traffic of Hedjaz and Palestine, (2) Muslim education in Bengal and (3) The Working of the Dyarchical system in Bengal.

His activities in public life as well as in cultural field are too well-known to need comment. Not only will his loss be felt in his own immediate circle, but also in the Province of Bengal, in India and in the wider world where his activities had endeared him to so many. The Society, too, of which he was

a member for over 14 years will sadly miss his kindly presence and be the poorer by his demise.

M. HIDAYAT HOSAIN.

(*Read in the Ordinary Monthly Meeting of 4th September, 1939.*)

DR. GEORGE ALBERT BOULENGER.

(1858-1937.)

Dr. George Albert Boulenger was born of Belgian parents at Brussels on Oct. 19, 1858, and died at St. Malo on Nov. 23, 1937, at the age of 79 years. From his boyhood he exhibited a passion for Natural History and ultimately became one of the greatest descriptive biologist of his day, his special love being Batrachians, Reptiles and Fishes. Educated at the Brussels University, he served for a short time as assistant in the Natural History Museum, Brussels. In 1882 he was appointed as an assistant in charge of the Reptile Collection in the Department of Zoology, British Museum (Natural History), a position which he held with great distinction for nearly 40 years, until his retirement in 1920.

Gifted with great energy and passion for work, he produced an enormous number of first-class papers and monographs, among which may be mentioned his catalogues of Batrachians, Lizards, Chelonians, Crocodiles, Snakes, etc., works which are regarded as standard to this day. His writings on Fishes in the Cambridge Natural History series and elsewhere are equally important.

Indian Zoology also owes a debt to him. He wrote the volume on Reptiles and Batrachians (1890) in the Fauna of British India series; the Report on Reptiles collected by the Indo-Afghan Delimitation Commission; and the Report on Fresh-water Fishes and Reptiles (1909) collected by J. Stanley Gardiner's Expedition in the Indian Ocean.

The learned world honoured him in many ways. He was elected a Fellow of the Royal Society of London in 1894, and was for several years a Vice-President of the Zoological Society of London. Foreign Societies all over the world elected him an Honorary Fellow, and many Universities conferred on him Honorary Doctorates. By his death Zoology has lost a great and indefatigable researcher.

M. L. ROONWAL.

(*Read in the Ordinary Monthly Meeting of 4th September, 1939.*)

**PROCEEDINGS OF THE MEDICAL SECTION
MEETINGS, 1939.**

No meeting of the Medical Section was held during the year.

PUBLICATIONS OF
THE ROYAL ASIATIC SOCIETY OF BENGAL

IN THE

BIBLIOTHECA INDICA SERIES

1939

I. SANSKRITIC WORKS

- (1) SAUNDARANANDA KĀVYA of Ārya Bhadanta
Aśvaghōṣa.

Work No. 192.

Editor: Mahāmahopādhyāya Haraprasad Shastri,
C.I.E., M.A., D.Litt., F.A.S.B.

Re-issue with additions by Professor Chintaharan
Chakravarti, M.A.

Demy Octavo, pp. 1*-20*, + i-xxiv, + 1-158.

Price Rs.3.

This is a very important old Sanskrit Buddhistic epic poem, and the work now published is a re-issue of the *editio princeps* with additional matters by Prof. Chintaharan Chakravarti as follows:—

1. An amalgamated list containing all emendations found in various publications dealing with the Saundarananda.
2. A bibliography of the Saundarananda.

- (2) ĀTMATATTVAVIVEKA of Udayanācārya.

Work No. 170.

(With the commentaries of Śaṅkara Miśra, Bhagīratha
Thakkura and Raghunātha Tārikikaśiromaṇī.)

Editors: Mahāmahopādhyāya Vindhyesvariprasada
Dvivedin and Pandit Lakshmana Sastri Dravida.

Concluding fasc. No. 6.

Demy Octavo, pp. i-xiv, + 417-948.

Price Rs.4-8.

(Fascicles 1-5 published 1907-1925, all available.

Price Rs.3-12.)

Price of complete work—Rs.8-4.

This is a well-known Nyāya treatise. It seeks to establish the conception of the permanent souls in refutation of the Buddhist theories against it.

The edition, as the title indicates, is accompanied by commentaries of Śaṅkara Miśra, Bhagīratha Thakkura and Raghunātha Tārkika-śiromaṇi.

(3) MANU-SMṚTI, Volume II.

Work No. 256.

(With the 'Manubhāṣya' of Medhātithi.)

Edited from several manuscripts by Mahāmahopādhyāya Ganganatha Jha, M.A., L.Litt., LL.D.

Royal Octavo, pp. 1-494.

Price Rs.5.

(4) MANU-SMṚTI, Volume III.

Work No. 256.

Index of Verses by Mahāmahopādhyāya Ganganatha Jha, M.A., D.Litt., LL.D.

Royal Octavo, pp. i-iv, + 1-2, + I-IV, + 1-102.

Price Rs.2.

(Volume I published 1932, Volume II, 1939 and Volume III, 1939.)

Price Volume I—Rs.6; complete Volumes I-III, Rs.13.

The learned editor, as a result of a detailed study of the commentary of Medhātithi which he translated into English for the University of Calcutta, has been able to evolve 'some sort of a readable and understandable text' of this commentary even though the available manuscript material is extremely unsatisfactory. The present edition, besides containing the text of the Manusamhitā and the text of this valuable commentary thus constructed, contains a highly useful index of every foot of each verse of this Samhitā.

II. ARABIC AND PERSIAN WORKS

(1) TĀRĪKH-I-SHĀHĪ of Aḥmad Yādgar.

Work No. 257.

(Also known as Tārīkh-i-Salāṭin-i-Afāghina.)

A history of the Sultāns of Delhi from the time of Bahlūl Lūdī (A.H. 855-894) to the entry of Emperor Akbar into Delhi in A.H. 964.

Editor: M. Hidayat Hosain, Ph.D., F.R.A.S.B.

Royal Octavo, pp. i-x, + 1-482.

Price Rs.5.

It is an authoritative work dealing with the last two years of the Emperor Bābur's reign, and the entire history of the Afghan rulers of India.

The history was compiled under the orders of Dā'ūd Shāh bin Sulaimān, the last king of Bengal (A.H. 980-984, A.D. 1572-1576).

Mr. H. Beveridge remarked 'The most valuable part of his work is his account of the last two years of Bābur's reign'. Sir Wolesley Haig, Vincent A. Smith and other historians like Von Noer also quote this book in their works.

The edition is based on a careful collation of the available materials.

- (2) **TABAQĀT-I-AKBARĪ** of **Khwājah Nizāmuddīn Aḥmad**,
Volume II.

Work No. 225.

A history of India from the early Musalmān invasions
to the thirty-eighth year of the reign of Akbar.

Translated and annotated by Brajendranath De, M.A.,
I.C.S. (Retd.).

Revised and edited by Baini Prashad, D.Sc., F.R.A.S.B.,
F.N.I., F.R.S.E.

Volume III, Part I, Royal Octavo, pp. 1-464.

Price Rs.6-4.

Volume III, Part II, Royal Octavo, pp. i-li, + 465-816.

Price Rs.5.

(Text edition Volumes I-III issued 1913-1935, Price
Rs.17, and English translation Volumes I and II
issued 1928 and 1936, Price Rs.6-4 and Rs.11-5.
All available.)

It is amongst the best Persian histories and is the most reliable source of our information regarding the history of India from the early Musalmān invasions to the end of the 38th year of the Emperor Akbar's reign 1002 A.H. (1593-1594 A.D.). The text edition is based on collation of several manuscripts, while the value of the English translation is greatly enhanced by detailed critical notes to other available sources of reference and contemporary works. The Preface deals with the lives of the author and the translator and contains—in addition to the bibliographical notes on the sources of the *Ṭabaqāt*—a critical review of its importance as a historical work.

- (3) **AKBARNĀMA** of Abu-l-Fazl, Volume III, Fasc. 14.

Work No. 138.

A history of the reign of Akbar including an account
of his predecessors.

Translated from the Persian by H. Beveridge, I.C.S.
(Retd.), F.A.S.B.

Volume III, Fasc. 14, concluding fascicle, Royal Octavo, pp. i-xxxiv, + 1263-1276, and Index pp. 1-68.

Price Rs.2-8.

(Volume III, Fascs. 1-13 published 1897-1921, Price Rs.17-8.)

Price complete Volume III—Rs.20.

(Text edition Volumes I-III issued 1873-1886, Price Rs.38, and English translation Volumes I and II issued 1897 and 1921, Price Rs.10 each. Complete Volumes I-III, Price Rs.40. Few copies of Volumes I-III are still available. Loose copies of Volumes I and II are separately available.)

This work is the official detailed and authentic history of the reign of the Emperor Akbar, and his predecessors. It was compiled by the order of the Emperor by Abu-l-Fazl who used for his material the private memoirs which were supplied to him under orders of the Emperor, the official records, the royal proclamations, and the letters and returns of the officers of the State. The work during its progress was submitted to the Emperor, who corrected and supplemented it from his personal recollections.

(4) *Ā'ĪN-I-AKBARĪ* by Abu-l-Fazl 'Allamī.

Work No. 61.

Translated from the original Persian by H. Blochmann, M.A.

Second edition, revised by D. C. Phillott, Lt.-Col., M.A., Ph.D., F.A.S.B.

Volume I, Royal Octavo, pp. i-lx, + 1-736, + Plates 1-17 and 1 Table. (Printed in England.)

Price Rs.25.

This is a thoroughly revised and greatly enlarged edition of the well-known translation of Volume I of *Ā'īn-i-Akbarī* by the late H. Blochmann. The work had been out of print for a long time. It is a most important work of reference for the history of the Moghul times.

(5) *RUBĀ'ĪYĀT OF 'UMAR-I-KHAYYĀM.*

Work No. 258.

Persian text edited from a manuscript dated 911 A.H. (1605 A.D.) with a facsimile of the manuscript.

Editor : M. Mahfuz-ul Haq, M.A.

Complete work.

Royal Octavo, pp. i-viii, + 1-92, with Plates I-LVII.

Price Rs.20.

This text of the *Rūbā'iyāt* is based on a manuscript which is considered to be the oldest and the only illustrated copy of the quatrains of Khayyām yet discovered. The beautiful ornamentation, illumination, calligraphy and the charming miniatures are the chief features of this manuscript. Three four-coloured blocks have been reproduced in the work to give the reader an idea of the beauty of the manuscript. In the Preface the editor has described the importance of the *Rubā'iyāt* and includes an account of the author. The manuscript copy was transcribed by the world famous calligrapher, Sultān 'Alī of Mashhad, and illuminated and illustrated by some of his worthy colleagues who had lavishly expended gold, lapis lazuli, and other costly materials in adorning the manuscript for presenting it to some royal personage.

(6) *HAFT-IQĪM* of Amīn Aḥmad Rāzī, Volume I, Fasc. 3.

Work No. 215.

The Geographical and Biographical Encyclopædia.

Editors: A. H. Harley, M.A., Khān Bahādūr Maulvī
Abdul Muqtadir, and M. Mahfuz-ul Haq, M.A.

Volume I, Fasc. 3, concluding fascicle, Royal Octavo,
pp. i-vi, + Notes 1-66, + Persian text 209-312.

Price Rs.2-8.

(Volume I, Fascs. 1 and 2 published 1918-1927, Price
Rs.3.)

Price complete Volume I—Rs.5-8.

A famous Geographical Encyclopædia, describing the seven Iqlims or climates of the world—their chief countries and towns, giving at the same time the past and the present history of each town and full biographical notices regarding their celebrated men. The work was compiled in six years by Amīn Aḥmad Rāzī and completed in A.H. 1002, A.D. 1594. The first volume of the text with elaborate notes is now complete and succeeding volumes will be issued as they are completed.

(7) *'AMAL-I-ŠĀLIH* or *SHĀH JAHĀN NĀMAH* by
Muḥammad Šāliḥ Kambo, Volume III, Fasc. 5.

Work No. 214.

A complete history of the Emperor Shāh Jahān.

Editor: Ghulam Yazdani, O.B.E.

Volume III, Fasc. 5, concluding fascicle, Royal Octavo,
pp. i-xvi, + 385-490.

Price Rs.2.

(Volume III, Fascs. 1-4 published 1928-1936, Price
Rs. 4.)

Price complete Volume III—Rs.6.

(Volumes I-III published 1912-1939, Price Vol. I—
Rs.7, Vol. II—Rs.6. All available. Index
Volumes I-III under preparation.)

It contains an account of the birth of *Shāh Jahān* and his predecessors from *Jahāngir* upwards to *Timūr*; the history of *Shāh Jahān's* minority; the account of his reign from his accession to the time of his confinement; and the biographical notices of eminent persons of his time. The text edition is completed with the fascicle printed during the year. It is a very important contemporary history of the time.

III. CATALOGUES OF MANUSCRIPTS

- (1) CATALOGUE OF THE ARABIC MANUSCRIPTS, Volume I, in the collection of the Royal Asiatic Society of Bengal.

Prepared by Wladimir Ivanow.

Revised and edited by M. Hidayat Hosain.

Royal Octavo, pp. i-xvii, + 1-694.

Price Rs.10.

This work is a descriptive Catalogue of 1,200 Arabic Manuscripts in the Library of the R.A.S.B. dealing with religious subjects of Islām, such as, commentaries of the Qur'ān, Sayings of the Prophet, Jurisprudence, Scholastic Theology and Sufism. The collection is particularly rich in Shi'ite and Zaidite works which are not generally found in most libraries of India or abroad.

- (2) DESCRIPTIVE CATALOGUE OF SANSKRIT MANUSCRIPTS, Volume VIII, Tantra, Part I, in the collection of the Royal Asiatic Society of Bengal.

Prepared by MM. Haraprasad Shastri, C.I.E., M.A., D.Litt., F.A.S.B.

Revised and edited by Prof. Chintaharan Chakravarti, M.A.

Royal Octavo, pp. i-iv, + 1-608.

Price Rs.8-12.

[Vol. I, Buddhist MSS., published 1917, Price Rs.3.

„ II, Veda, „ 1923, „ Rs.17-8.

„ III, Smṛti, „ 1925, „ Rs.15.

„ IV, History and Geography, „ 1923, „ Rs.2-8.

„ V, Purāṇa, „ 1928, „ Rs.15.

„ VI, Vyākaraṇa, „ 1931, „ Rs.12-8.

„ VII, Kāvya, „ 1934, „ Rs.10.

All available.]

The present part contains detailed description of 648 manuscripts on Tantra: (1) 362 MSS. of original Tantras, (2) 286 MSS. of later digests of which 133 belong to comprehensive and general works, and 153 to works pertaining to different aspects of Śakti or the Divine Mother.

The editor in his descriptions has, among other things, drawn attention to special features of the manuscripts as revealed by a careful analysis and a comparison of the available printed editions or descriptions in other catalogues.

